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The semantics and pragmatics of motion verbs in air traffic English and general English

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ABSTRACT

The aim of this paper is to determine the meanings of 54 motion verbs as they are used in air traffic and general English. Employing a componential method, we discover that ten distinctive features are necessary and sufficient to identifying the internal structure of the verbs under consideration. Based on these findings, we contrast the uses of ten motion verbs in the registers of air traffic and everyday English to establish semantic relations. Five semantic relations are discussed. Examples provide evidence of semantic differences in subject matter, which show that there are sometimes pragmatic differences also, and that agency causes changes in verbal meaning in the two contexts. The issues examined in this study may be of substantial interest to ESP practitioners, to aeronautical and aviation students, and to pilots and air traffic controllers.

1. Introduction

There has been a growing interest in the semantics of verb classes and in the uses of verbs in recent years. If verbs are analysed and described in terms of their semantic components, they present complex semantic structures. The semantic structures of lexical units such as verbs are treated as systems of meanings. Achieving the appropriate representation of the meaning of verbs is arduous and complex. Motion verbs present no exception. A great problem occurs when linguists try to establish a complete and stable set of semantic features. The most developed proposal seems to be that of Wierzbicka (1972, 1985, 1989) in her works on semantic primitives.

The verbs of motion have received close attention in semantics literature (cf. Talmy 1985; Tsujimura 2003; Slobin 2004). However, there

have been few investigations into the semantics and pragmatics of motion verbs in air traffic and general English. This paper is an attempt to reveal necessary semantic features which determine the meanings of some motion verbs used in air traffic communications and everyday English, and to look at their possible semantic relations.

2. Rationale, corpus and method

The purpose of this paper is to identify semantic components/features of 54 verbs of movement used in the field of air traffic (A) and in general English (G), and to establish semantic relations between some of the verbs used in general and specific contexts. In order to achieve this aim, definitions of the verbs under scrutiny are obtained from specialist dictionaries and general English dictionaries (see Sources below), and can be found in the Appendix at http://www.sf.bg.ac.rs/downloads/appendix_motion_verbs1.pdf. The composition of the verbs is examined by means of a componential method (structuro-lexico-semantic analysis).

C[omponential] A[nalysis] or lexical decomposition was patterned on the phonological methods of the Prague School, which described sounds by determining the absence and presence of features. Hjelmslev (1943) introduced this approach within structuro-componential semantics (of the Copenhagen School). The method was further improved by Katz – Fodor (1963: 170-210) in their article “The structure of a semantic theory” as well as others, including Nida (1975a, b) and Jackendoff (1990), and it continues to be relevant and beneficent in recent work. Although CA has been employed in the framework of the GT model, it has also been adopted in the field of the semantics of first language acquisition (see Clark 1973: 65-110), in contrastive semantics (cf. Nöth 1979: 25-40; Koulikova 2006), in first- and second-language reading comprehension (van Gelderen et al. 2004: 19-30), in learning and memory processes (Cornoldi et al. 2008: 103-123), and so on. Hjelmslev (1943) argues that words can be analysed into what he calls “content figurae”. Nida (1975a: 229) uses the term “diagnostic component”, defined as “a semantic component which serves to distinguish one meaning from another, whether the meanings belong to one word or several [...]”. The terms “distinctive component”, “essential component”, and “contrastive component” are also found in the literature to indicate important semantic features. In this paper, the “indexicality”¹ of motion verbs is revealed by “distinctive features”. “Distinctive features” are understood to be features

¹ The term “indexicality” is taken from Garfinkel (1967), and Mehan – Wood (1975).

which are contained in the definitions of the motion verbs analysed and which differentiate the meaning of one verb from those of others. For sake of precision, we assume that “distinctive” can refer to one or more features, and that all features cannot apply to all motion verbs.

To better follow the analysis, we should keep in mind that verbs of motion are understood to be verbs that express a kind of movement. Motion verbs require a spatio-temporal component, which means that objects change their position or orientation over time. Verbs of motion may also include additional components (e.g. culminating conditions and manner of motion). Examples of verbs specifying manner of motion include *rotate*, *pitch* and *glide*, and those of verbs of inherently directed motion include *enter*, *leave* and *return* (cf. Levin 1993). The lexical field examined in this paper is delimited by the framework of Frawley’s 1992 and Levin’s 1993 characterisation of motion events. Our main intent is to examine semantic components of English motion verbs as employed in air traffic registers and everyday language.

The starting point of the analysis presented here is Hüllen’s article “Movements on Earth and in the Air”, published in 1981. The article considers twelve motion verbs and four binary oppositions: “+ / - own energy”, “+ / - ground contact”, “+ / - telic” and “+ / - normal”. Our hypothesis that these oppositions are insufficient to determine the meanings of the 54 verbs of motion discussed triggered this investigation. Although the method chosen for the analysis has been criticised heavily since the 1960s, it seems that the extension of the system of distinctive features, added to specify certain semantic components, i.e., movements of aircraft, does help us represent the verb meanings in question more fully. Apart from the symbols “+ / -”, the inclusion of the symbols “ \wedge / \vee ”, “ $>$ / $<$ ” and “ \rightarrow / \leftarrow ” was necessary: airplane movements are performed at different speeds; that is, there is no presence or absence of speed if a plane moves, and a speed increase and a speed decrease may be represented as “ \wedge / \vee ”; aircraft movements are dangerous to a certain degree, and therefore they may be represented as “dangerous to a greater degree” (“ $>$ ”), or “dangerous to a lesser degree” (“ $<$ ”); finally, it is proposed here that “non-movement to movement transition” or “movement to non-movement transition” feature takes the symbols “ \rightarrow / \leftarrow ”. These modifications to the method are introduced to make the approach more adequate for the verbs under discussion. We present details below.

3. Analysis, results and discussion

In this section, the verbs of movement to be considered are first classified according to their internal structure, i.e., according to ten distinctive features

reflected in common dictionary definitions of the verbs. A set of examples is then provided to illustrate how some of these verbs are used in general English and in the field of air traffic. After the uses of the verbs have been compared with regard to the ten distinctive features, five semantic relations are established and discussed.

3.1 The first phase of the study

The results of the first phase in the analysis are presented in Tables 1-10. The ten “distinctive features” present are as follows: “+ / - own energy”, “+ / - ground contact”, “+ / - under control”, “→ / ← non-movement to movement transition or movement to non-movement transition”, “+ / - movement from one place to another”, “+ / - directional movement”, “+ / - telic”, “^ / v speed”, “+ / - disrupted movement”, and “> / < dangerous movement”.

3.1.1 Distinctive feature “+ / - own energy”

Table 1 contains the verbs of motion related to “movement with one’s own energy / movement without one’s own energy”.

Table 1. Verbs of movement with regard to the opposition “+ / - own energy”

| | |
|--------------|---|
| + own energy | <i>taxi, roll₁, take off, climb, cruise, crab, descend, sink, dive, let down (partial power), touch down, pitch, roll₂, yaw, nosedive, pull up, ascend, lift, thrust, stretch, board, embark, launch, boost, abort, bank, approach, manoeuvre, head, travel, get, fly, rotate, skid, slip, go around, home in, loop, balloon, close up, ditch, loiter, overrun, overtake, embark, hold, shuttle, roll₄</i> |
| - own energy | <i>drift, (descend), sink, dive, (touch down), glide, pitch, roll₃, yaw, nosedive, stall, abort, flutter, buffet, skip, ditch, sag</i> |

Table 1 shows that there are four meanings of the verb *roll* in the field of air traffic. They are designated as *roll*_{1,2,3,4}. According to the dictionaries used in this analysis, the verb *roll* has the following meanings in the air traffic register: *roll*₁ – ‘to move an aircraft under its own power in contact with the earth over the runway, either with increasing speed for take-off or with decreasing speed after touchdown’; *roll*₂ – ‘to move an airplane about the longitudinal axis in the air’; *roll*₃ – ‘to lean to one side and then to the other because of the wind’; *roll*₄ – ‘to turn to the left or to the right’. When used in general English, this verb has the meaning of ‘to move along on wheels or

by turning over and over, frequently without a fixed direction or aim'. The verbs (*descend*) and (*touch down*), having the feature “- own energy”, differ in meaning from *drift*, *sink*, *dive* and *stall* because planes can descend and touch down without using their own energy but cannot do so without the pilot's control and the earth's gravity and inertia. The two verbs are therefore given in brackets in Table 1. *Drift*, *sink*, *stall*, *flutter*, *skip* and *sag* indicate movements performed without the pilot's will.

3.1.2 Distinctive feature “+ / - ground contact”

Table 2 shows the verbs of movement analysed with regard to “+ / - ground contact”.

Table 2. Verbs of movement in relation to the opposition “+ / - ground contact”

| | |
|------------------|---|
| + ground contact | <i>taxi</i> , <i>roll</i> ₁ , <i>boost</i> , - → + <i>touch down / land</i> |
| - ground contact | <i>roll</i> _{2,3,4} , <i>climb</i> , <i>descend</i> , <i>ascend</i> , <i>fly</i> , <i>nosedive</i> , <i>boost</i> , <i>pull up</i> , <i>cruise</i> , <i>drift</i> , <i>crab</i> , <i>dive</i> , <i>sink</i> , <i>let down</i> , <i>glide</i> , <i>lift</i> , <i>pitch</i> , <i>yaw</i> , <i>stall</i> , <i>rotate</i> , <i>flutter</i> , + ↑ - ↓ <i>skip</i> , <i>slip</i> , <i>go around</i> , <i>home in</i> , <i>loop</i> , <i>balloon</i> , <i>close up</i> , - → + <i>alight</i> , - → + <i>ditch</i> , <i>loiter</i> , <i>hold</i> , <i>overtake</i> , + → - <i>take off</i> |

The symbols “+ ↑ - ↓” associated with the verb *skip* in Table 2 signal a change of movement from the ground to the air and from the air to the ground. The verbs *alight* and *ditch* and their symbols “- → +” indicate movements from the air to water, while the phrasal verb *take off* and its symbols “+ → -” designate a movement from the ground to the air.

The phrasal verb *pull up*, which is seen in general English in example (1G) has the “+ ground contact” feature, whereas it has the “- ground contact” feature in air traffic, as in (1A).

(1) G: The car *pulled up* outside the station².

A: After the plane had been diving for some time, it entered a new phase, the upward movement. It began *pulling up*.

The verbs *cruise*, *descend*, *climb*, *dive* and *fly* always contain the feature “- ground contact” in air traffic usage. The following examples illustrate this:

² If sources for examples quoted within the text are not given, it means that they are the author's own examples.

A plane cruises if it travels under its own power in the air at a practical speed; The tower instructed the American pilot to descend; The aircraft starts to climb if the control column is moved backwards; If the elevators are lowered, the aircraft dives; Airbus Industrie's A340 can fly non-stop from Europe to Australia. In contrast, these verbs, excluding the verb fly, comprise the feature “+ ground contact” in everyday English, as shown in: The car cruises at a cruising speed of 50 miles an hour; Mary descended the stairs; The old lady climbed the stairs slowly. The verb dive incorporates a movement from the ground through the air into water, a movement in the air and in water, that is, a transition from one movement to another, as in He dived from the bridge with style³.

3.1.3 Distinctive feature “+ / - under control”

The verbs of motion are classified in Table 3 in regard to the feature “+ / - under control”.

Table 3. Verbs of movement in regard to the opposition “+ / - under control”

| | |
|-----------------|---|
| + under control | <i>taxi, roll₁, roll₄, take off, climb, cruise, let down, touch down, stretch, boost, bank, approach, head, manoeuvre, pull up, ascend, lift, thrust, board, launch, fly, go around, home in, loop, ditch, loiter, overtake, hold, glide, balloon, stall, pitch, abort, sink, dive, nosedive, overrun</i> |
| - under control | <i>roll₂, roll₃, ditch, sag, drift, flutter, stall, pitch, skip, sink, dive, nosedive, overrun</i> |

Table 3 shows that the verbs *touch down, ditch, stall, pitch, abort, sink, dive, nosedive* and *overrun* fall into both categories “+ under control” and “- under control”, if used in air traffic English and general English. The following examples and explanations illustrate and support this claim:

- (2) G: The ball *touched down*.
 A: The aircraft *touched down* on schedule. (*The Free Online Dictionary*)

The meaning of the phrasal verb *touch down* incorporates the “- under control” feature in (2 G), and the “+ under control” feature in (2A).

The verb *ditch* has the meaning of ‘to leave suddenly, to abandon’ and can include both the feature with the positive symbol and the feature with

³ Examples in this paragraph are extracted from relevant British and American sources, and can be found in Dimković-Telebaković (2003: 192).

the negative symbol as in (3G). In (3A), it conveys the meaning of ‘to make a forced landing on water’ and includes the “+ under control” feature.

- (3) G: The thief *ditched* the purse in an alley.
 A: The plane *ditched* in the water. (*The Free Online Dictionary*)

In (4G), the verb *stall* has the meaning of ‘to delay, to put off’ and therefore takes the “+ under control” feature, whereas in (4A) it has the “- under control” feature.

- (4) G: We *can stall* the sale until we can be sure we have the money.
 (*Longman Dictionary* 1978: 1085)
 A: The air resistance or drag causes the plane *to stall*, that is, to fall below the minimum speed (which is 35 miles to keep the average plane in the air) necessary for horizontal flight or control. (Dimković-Telebaković 2003: 189)

Contrary to (4A), some other examples show that the motion of stalling can occur under control – *The pilot caused the plane to go into a stall.*

The meaning of the verb *pitch* ‘to set up a tent’ incorporates the feature “+ under control” in (5G) and the feature “+ under control” in (5A), where it has the meaning of ‘to turn about a lateral (transverse) axis so that the forward end rises or falls in relation to the after end’, i.e., ‘to move up and down’ or ‘to move backwards or forwards with the movement of air’.

- (5) G: He *pitched* a tent on open ground.
 A: The plane started *to pitch*.

The following examples illustrate that the feature “+ under control” should be included in the meanings of the verb *abort* in the two contexts. As far as air traffic is concerned, we can say that there are plenty of examples where a pilot is forced to take the decision of aborting a landing due to equipment failures, to human errors, to weather conditions, or due to a combination or sequencing of these factors (see the *NTSB aviation accident database* at <http://www.airsafe.com/analyze/ntsbdb.htm>). The meaning of the verb *abort* in (6G) is ‘to end (a pregnancy) too soon’ and in (6A) ‘to end flight before expected time because of some trouble’. In both actions, the degree of control is the same, and the Agent stops the process before completion. In contrast, the meaning of the verb *abort* in *She aborted spontaneously* is ‘to give birth too early to (a dead child)’, where the verb is intransitive. Since the verb has a different meaning, it is possible to classify it as the “- under control” feature.

- (6) G: The doctor had *to abort* the baby/the pregnancy. (*Longman Dictionary* 1978: 3)
 A: The pilot was then forced *to abort* a landing.

Further, sentence (7G) contains the verb *sink* with the “+ under control” feature, whereas in sentence (7A) *sink* exhibits the “- under control” feature and the meaning of ‘to move an aircraft downwards in the air under its own power or under an external force with the risk of dangerous results (like crashing into other planes, touching the ground, etc.)’. In contrast, examples (8G and A) and (9G and A) show that the positive value of the feature can be incorporated into the meanings of the verbs *dive* and *overrun* when used in general and specialist contexts. The verb *dive* has the meaning of ‘to go under the surface of the water’ as in (8Ga), and the meaning of ‘to move quickly, esp. downwards, head first, or out of sight’ as in (8Gb), as well as ‘to move an aircraft downwards under its own power or under the external force of gravity with increasing speed’ as in (8A). The examples containing the verb *dive* show that the primary sense of *dive* has been changed, i.e., that in some specific uses we find metaphorical meanings of particular items. The verb *overrun* also supports this claim since it has the meaning of ‘to spread over and occupy and usually harm’ in (9G) and ‘to get out across the runway end during landing or aborted take-off’ in (9A). Although planes mainly overrun without the pilot’s control, the movement can be performed under control if an engine failure forces the pilot to overrun.

- (7) G: They *sank* fence posts yesterday.
 A: After the plane *had been sinking* for some time, it crashed into another plane.
- (8) Ga: They *are diving* for gold from the Spanish wreck.
 Gb: The rabbit *dived* into its hole. (*Longman Dictionary* 1978: 319)
 A: Reports suggest that both planes *were diving* to avoid each other at the time of the crash.
- (9) G: The enemy *overran* the conquered country. (*Longman Dictionary* 1978: 775)
 A: When landing, the pilot was forced to *overrun*.

The verb *nosedive*, as used in (10G and A), demonstrates that the feature “- under control” is needed to define the verb meaning more precisely. The definition of the verb given in common dictionaries is ‘to fall or drop

suddenly and by a great deal, as in prices', or 'to come down steeply with the nose pointing to earth at the maximum speed'.

(10) G: The prices *do not nosedive* here. They go up daily.

A: The cockpit was submerged as the plane *nosedived* into the water.

A comparison of the verb meanings expressed in the above sentences with the verb definitions provided in dictionaries reveals that the definitions do not contain the feature "+ / - under control". The question arises: Does the decompositional semanticist know what the right features are and how many of them is enough to define a word meaning? The only answer to the question seems to be: s/he searches for distinctive features and includes as many as are discovered in definitions of words, no matter what their number. This means that the existing definitions of motion verbs require the inclusion of the "+ / - under control" feature.

3.1.4 Distinctive feature "→ / ← non-movement to movement transition or movement to non-movement transition"

Leech (1971: 19) calls the verbs *arrive, land, leave, stop, get* and *go* "transitional event verbs", because they denote transition from one state to another. Table 4 shows how such verbs are categorized according to the distinctive feature "→ / ← non-movement to movement transition or movement to non-movement transition". It is important to note that movements in regard to this distinctive feature are performed by planes from the ground (*launch, depart, leave, board*), from the ground into the air and in the air (*boost*), from the air to the water (*alight, ditch*), and from the air to the ground (*abort, arrive, stop, end, embark*).

Table 4. Verbs of movement related to the opposition "→ / ← non-movement to movement transition or movement to non-movement transition"

| | |
|---------------------------------------|---|
| → non-movement to movement transition | <i>launch, boost, depart, leave, board / embark</i> |
| ← movement to non-movement transition | <i>alight, ditch, abort, arrive, stop, end</i> |

3.1.5 Distinctive feature "+ / - movement from one place to another"

Table 5 comprises the verbs of motion which denote either movements from one place to another or circular movements.

Table 5. Verbs of movement in relation to the opposition “+ / - movement from one place to another”

| | |
|--------------------------------------|---|
| + movement from one place to another | <i>lift, roll₁, taxi, travel, shuttle, climb, ascend, board /embark, let down, fly, descend, stretch, loop</i> |
| - movement from one place to another | <i>rotate, go around, loiter, hold</i> |

The following constructions illustrate the use of the verbs *taxi*, *lift*, *let down* and *descend*, having (+) value.

- (11) G: His friend *taxis* in Munich.
A: The pilot *is taxiing* now.

The verb *taxi* means ‘to ride in a taxi’ in (11G), and ‘to move an aircraft under its own power on the ground between terminal buildings or maintenance hangers and runways before taking off or after landing’ in (11A).

- (12) G: She *couldn’t lift* her bag. It was too heavy.
A: The wings provide the lift necessary to overcome the weight of the aircraft and *lift* it through the air. (Dimković-Telebaković 2003: 199)

The meaning of the verb *lift*, as used in (12G), is ‘to elevate’, and its meaning in (12A) is ‘to ascend an airplane by making an effort to overcome resistance of weight’.

- (13) G: She *let* the window *down*.
A: The pilot slowed down and *let down* in a gradual descent.

Example (13G) contains the verb *let down* which means ‘to take down’, and in example (13A) it has the meaning of ‘to move an aircraft downwards in the air under its own power by which it descends from its initial approach altitude to the final approach altitude’.

- (14) G: The sun *descended* behind the hills.
A: Air France 818 was recleared *to descend* to flight level 70. (Dimković-Telebaković 2003: 200)

The meaning of the verb *descend* in (14G) is ‘to go down’, and in (14A) ‘to move an aircraft downwards in the air at an angle which is determined by

technical limitations and safety regulations, either under its own power or under the external forces of gravity and inertia’.

The following examples contain the verbs *rotate*, *go around*, *loiter* and *hold*, which have (-) value, that is, express circular movements in the air traffic field. The analysis below reveals their meanings in general English and in the air traffic register.

(15) G: You *can rotate* the wheel with your hand.

A: In order to maintain straight and level flight, the aircraft must be prevented from *rotating*. This depends not only on the magnitudes of the four forces (lift, weight, thrust and drag), but also on the positions at which they act. (Dimković-Telebaković 2003: 183)

The meaning of the verb *rotate* in example (15G) is ‘to (cause to) turn round a fixed point’, whereas in example (15A) it has the meaning of ‘to (cause to) turn in a circle, esp. around a fixed point’.

(16) G: She *goes around* quite a lot, working for an international firm.

A: Instead of landing, the Boeing 727 *went around*. (Dimković-Telebaković 2003: 189)

Example (16G) contains the verb *go around* which means ‘to move from place to place, to travel, to get about’, and the meaning of ‘to perform a circling manoeuvre to remain airborne instead of landing’ in (16A). As we can see, this verb does not entail circular movements in general English, and takes (+) value.

(17) G: They *loitered* on their way home. (Dimković-Telebaković 2003: 189)

A: There are three airplanes *loitering* within the holding area.

The meaning of the verb *loiter* in (17G) is ‘to go slowly and stop frequently on the way somewhere’, whereas in (17A) it conveys the meaning of ‘to fly slowly through the holding area, waiting for landing clearance’.

(18) G: *Hold* it tight.

A: *Hold* your position for landing traffic, over. (Dimković-Telebaković 2003: 189)

In example (18G), the verb *hold* means ‘to keep or support with a part of the body, esp. with the hands’, and in example (18A) it has the meaning of ‘to continue to fly through the holding area, waiting for landing clearance’.

3.1.6 Distinctive feature “+ / - directional movement”

Table 6 shows the categorization of the verbs of motion with respect to the distinctive feature “+ / - directional movement”.

Table 6. Verbs of movement with regard to the opposition “+ / - directional movement”

| | |
|------------------------|--|
| + directional movement | <i>take off, climb, descend, dive, sink, let down, nosedive, pull up, glide, pitch, roll, ascend, lift, thrust, approach, launch, head, skid, home in, loop, close up, shuttle</i> |
| - directional movement | <i>drift, yaw</i> |

Here are examples including some verbs of motion as used in general and air traffic contexts to illustrate their semantics and pragmatics with regard to “+ / - directional movement”.

(19) G: I *took off* my hat to the lady.

A: After the pilot has received clearance from the control tower, he is free to *take off*, leave the ground and rise.

The meaning of the verb *take off* in sentences (19G and A) entails upward movements, since it means ‘(to lift and) remove to another position’ in (19G), and ‘to move an aircraft upwards under its own power by which it loses contact with the earth’ in (19A). An upward movement is also expressed by the verb *climb* in examples (20G and A). The meaning of the verb is ‘to go or get up’ in general usage, and ‘to move an aircraft upwards under its own power in the air at an angle which is determined by technical limitations and safety regulations’ in air traffic use. The verb *ascend* has the meaning of ‘to climb, go up’ in (21G), and ‘to rise from a lower level or degree’ in (21A). All these verbs have the feature “+ directional movement”.

(20) G: It became hotter as the sun *climbed* in the sky.

A: As the pilot raised the elevators, the plane began to *climb*.

(21) G: We watched the mists *ascending* from the valley.

A: We watched the plane *ascending*.

Examples (22G and A) comprise the verb *thrust* which has the meaning of ‘to push with force’ and ‘to make a plane move forward by moving power of an engine’.

- (22) G: We *thrusted* our way through the crowd.
 A: To *thrust* the plane, the pilot must produce thrust which is greater than the drag.

The meaning of the verb *glide* is 'to move (noiselessly) in a smooth, continuous manner, which seems easy and without effort' in (23G), whereas its meaning in (23A) implies a downward movement- 'to move down smoothly and continuously under the force of gravity to descend without power'.

- (23) G: The toy boat *glided* over the lake.
 A: When the engines do not roar and the airplane descends smoothly and continuously, the aircraft *glides*.

Example (24G) contains the verb *home in*, which has the meaning of 'to aim exactly towards', and in example (24A) its meaning is 'to fly toward a radio signal with an ADF (automatic direction finder)'. This verb takes (+) value in both sentences with respect to the distinctive feature "directional movement".

- (24) G: Pigeons *are homing in*. (Dimković-Telebaković 2003: 189)
 A: The plane *is homing in*.

The meaning of the verb *drift* has a figurative meaning in (25G), since the verb means 'to go through life without aim, purpose or self-control'. Its meaning in (25A) is 'level movement of an aircraft in the air sideways away from its course under the force of wind'. It is obvious that both meanings here entail a negative feature of "directional movement".

- (25) G: She just *drifts* from job to job.
 A: The passengers on the plane realized that the plane *was drifting*.

3.1.7 Distinctive feature "+ / - telic"

Telic verbs describe actions which are directed towards an aim. The verb *drown* (vs. *be dead*) is a telic verb, for instance, whereas the verbs *know* or *like* are atelic verbs. Telic verbs can be combined into action chains, where every verb describes a phase of an entire occurrence: *leave* → *go* → *arrive* → *be there* (cf. Hüllen 1981: 149).

Table 7 demonstrates which verbs are telic and which ones are atelic.

Table 7. Verbs of movement in regard to the opposition “+ / - telic”

| | |
|---------|---|
| + telic | <i>roll_{1,4}, crab, let down, pull up, ascend, lift, stretch, board, take off, approach, manoeuvre, go around, head, home in, close up, loiter, leave, get/arrive/ reach, travel</i> |
| - telic | <i>fly, roll₃, sink, drift</i> |

Examples in (26G and A) illustrate that the verb *travel* has the feature “+ telic” in both everyday English and in the field of air traffic.

(26) G: We *travelled* a lot all over the country last year.

A: Louis Bleriot, a Frenchman, *travelled* the English Channel from Calais to Dover in 1909. (Adapted from Dimković-Telebaković 2009: 40)

The meanings of the verb in the above sentences are as follows: ‘to go on travels as for pleasure and sightseeing, to make a trip for pleasure’ in (26G), and ‘to travel the oceans, to go across, to fly across’ in (26A).

3.1.8 Distinctive feature “ \wedge / \vee speed”

Table 8 shows how the verbs of motion are classified with regard to whether there is an increase or decrease in speed.

Table 8. Verbs of movement related to the opposition “ \wedge / \vee speed”

| | |
|----------------|---|
| \wedge speed | <i>speed up / accelerate, dive (increase in speed), roll₁ (increase in speed)</i> |
| \vee speed | <i>speed slow down / decelerate, roll₁ (decrease in speed), stall (decrease in speed), abort (decrease in speed)</i> |

When considering the issue of motion, the presence and absence of speed cannot be taken as possible oppositions, as movements always happen at certain speeds. Thus, “ \wedge ” and “ \vee ” should be used in place of (+) and (-).

There are some verbs conveying movements performed at a maximum speed, at a constant speed, or at an economical speed. The verb *nosedive* contains the meaning of ‘to come down steeply with the nose pointing to earth at the maximum speed’, and the verb *cruise* ‘level movement of an aircraft under its own power in the air at a practical speed’ or ‘to travel at that speed and altitude which is most desirable for the airplane and the flight conditions’. As different types of speed cannot be represented by binary oppositions, a solution to the problem remains to be found.

3.1.9 Distinctive feature “+ / - disrupted movement”

Table 9 groups the verbs of motion according to whether each has the feature “+ disrupted movement” or the feature “- disrupted movement”.

Table 9. Verbs of movement in relation to the opposition “+ / - disrupted movement”

| | |
|----------------------|---|
| + disrupted movement | <i>abort, alight, shuttle</i> |
| - disrupted movement | <i>taxi, roll, take off, climb, cruise, dive, drift, crab, descend, hold, sink, let down, nosedive, pull up, glide, stall, ascend, lift, approach, travel, go around, close up, loiter, fly</i> |

The verbs *abort*, *alight* and *shuttle* include the feature “+ disrupted movement”, whereas the verb *crab*, for instance, implies a non-disrupted movement. *Crab* can truly be considered a technical term here. Its meaning is ‘level movement of an aircraft under its own power in the air sideways in order to neutralize drift and stay on course to compensate for a cross-wind’.

3.1.10 Distinctive feature “> / < dangerous movement”

To denote “movements which are dangerous to a greater degree and movements dangerous to a lesser degree”, we substitute “+ / - normal” (cf. Hüllen 1981: 150-151) for “> / < dangerous movement”. The symbols “> / <” indicate that each type of movement has a higher or lower risk of traffic accident, whereas the symbols “+ / -” signal the presence or absence of risk. To illustrate a movement that is very dangerous, we use the verb *sag*: *Changing winds made the plane sag*, meaning that the plane changed direction without its own power and that the risk of traffic accident was very high. In general English, the verb expresses a change in position which can cause a risk of falling down, such as in *The branch sagged under the weight of the apples*. The verb *stretch*, on the other hand, seems to convey a very low risk of traffic accident in air traffic as its meaning is ‘to cause to reach or continue (as from one point to another or across a space)’.

Table 10 shows how the verbs of motion can be classified according to this distinctive feature.

Table 10. Verbs of movement with regard to the opposition “> / < dangerous movement”

| | |
|----------------------|--|
| > dangerous movement | <i>drift, sink, abort, ditch, sag, dive, nosedive, stall, flutter</i> |
| < dangerous movement | <i>taxi, take off, climb, cruise, let down, ascend, lift, thrust, stretch, launch, go around, home in, loop, pull up</i> |

3.2 The second phase in the analysis

The second phase of this study resulted in the following semantic relations: “correspondence”, “reflexive marking” and “reshifting”, which are in accordance with Hüllen’s (1981: 146-149) discussion, and “reflexive marking and reshifting” and “correspondence and reflexive marking”, which are introduced by the author of this paper. To demonstrate these semantic relations, ten randomly selected motion verbs are examined in general English and in air traffic English in regard to the above mentioned ten distinctive features.

3.2.1 Correspondence

The semantic relation “correspondence” is established between verbs used in general English (G) and in the air traffic register (A) in cases when the subject, agentive, is an animate or inanimate being in both general and specialist use, and when verbal meanings correspond to each other.

The verb *fly* shows this correspondence. With regard to the distinctive feature “+ own energy”, this semantic relation is illustrated by examples (27G and A).

- (27) G: Most birds and some insects *fly*. (*Longman Dictionary* 1978: 427)
 A: The French engineer Henri Giffard attached engine to a balloon and *flew* in it 17 miles from Paris to the suburbs. (Dimković-Telebaković 2009: 40)

In regard to “- movement from one place to another”, the verb *rotate* as used in (28G and A) establishes the same semantic relation. The verb *rotate* has the meaning of ‘to revolve, go around’ in (28G), and the meaning of ‘to (cause) to turn in a circle’ in (28A).

- (28) G: The earth *rotates* once every 24 hours. (*Longman Dictionary* 1978: 966)
 A: The balloons will *rotate* at the same speed as the earth does. (Dimković-Telebaković 2003: 201)

It is significant to point out here that there are two rotation types: the earth rotates round the sun as well as round its axis.

3.2.2 Reflexive marking

The semantic relation “reflexive marking” occurs in cases when the subject, agentive of a sentence in general use, is an animate being, and when the

agentive/instrument and objective/indirect objective (dative) of a sentence in specialised use are identical. In other words, the semantic structure of sentences with verbs having the feature “+” is called “marking” in ordinary usage, and “reflexive” is related to the identity of agentive/instrument and objective/dative, which is a characteristic of the language of pilots. This means that the person who causes movements is the pilot using the power unit as instruments in such a way that energy is produced, which in turn makes the plane perform movements (Cf. Hüllen 1981: 146-147).

This semantic relation can be established in regard to the distinctive feature “+ / - ground contact”, as shown in (29G and A).

- (29) G: The old lady *climbed* the stairs slowly.
 A: If the stick is moved backwards, the aircraft starts *to climb*. (Dimković-Telebaković 2009: 69)

Examples (30G and A) illustrate that with regard to the feature “+ directional movement” the verb *approach* establishes the same semantic relation “reflexive marking”. The verb *approach* in (30A) shows that it can be classified as a verb used in the field of air navigation.

- (30) G: Tom *was approaching* a red building when a friend of his turned up suddenly.
 A: *Approach* Shuttle 7R flight level 70. (Dimković-Telebaković 2003: 202)

3.2.3 Reshifting

If there is a change in the meaning of a verb when it is used alternately in general English and in specialised contexts, the semantic relation “reshifting” is established between the two uses. Examples (31G and A) demonstrate this semantic relation with regard to the distinctive feature “+ / - ground contact”. The shift of meaning in *bank* goes from ‘to raise a bank’ to ‘to incline an airplane laterally, to roll the plane sideways somewhat (e.g. when turning)’.

- (31) G: They *banked* the river.
 A: The pilot *must bank* when he turns a plane.

When the pilot *banks*, the wings are not level.

The verb *ditch* in (32G) has the meaning of ‘to get rid of, to leave suddenly, to abandon’, and the meaning of ‘to make a forced landing on

water' in (32A). The examples in (32G) and (32A) suggest that there is a semantic relation "reshifting" established between the two uses of the verb *ditch* in regard to "↓ movement to non-movement transition".

(32) G: His old car stopped working and he decided *to ditch* it. (*Longman Dictionary* 1978: 319)

A: The pilot *ditched* his plane.

3.2.4 Reflexive marking and reshifting

The verb *dive* as used in (33G and A) establishes the semantic relation "reflexive marking and reshifting". The meanings of the verb in the sentences below are as follows: 'to put one's hand(s) quickly and suddenly deep into something, esp. in order to get something out' and '(of a plane) to go down steeply and swiftly'. This twofold semantic relation is established in regard to the distinctive feature "↑ speed".

(33) G: He *dived* into his pocket and pulled out a handful of coins.

A: The elevators make the aircraft *dive*, i.e., go down steeply with increasing speed.

Examples (34G and A) show that the verb *roll* establishes the semantic relation "reflexive marking and reshifting" with regard to the distinctive feature "+ under control".

(34) G: We *rolled* the barrel of wine onto our boat.

A: Planes *roll* and taxi on the ground before take-offs and landings. (Dimković-Telebaković 2003: 195)

The verb *roll* has the meaning of 'to move along by turning over and over' in sentence (34G), and the meaning of 'to move an aircraft under its own power and under control in contact with the earth over the runway, either with increasing speed for take-off or with decreasing speed after touchdown' in example (34A).

3.2.5 Correspondence and reflexive marking

With regard to the distinctive feature "+ telic", the verb *head* establishes the semantic relation "correspondence and reflexive marking" in (35G and A). The meanings of the verb *head* used in the two sentences correspond to one another. This verb has the meaning of 'to move in a certain direction' in (35G), and the meaning of 'to move towards, go to' in (35A).

(35) G: *We are heading* home.

A: F-BNTS *heading* 230 from Lambourne. (Dimković-Telebaković 2003: 203)

The verb *shuttle* means 'to move to and fro regularly' in example (36G) and 'to fly from one place to another regularly' in example (36A). In regard to the distinctive feature "+ disrupted movement", the verb establishes the semantic relation "correspondence and reflexive marking". It is important to emphasize here that the distinctive feature "+ disrupted movement" is included in these senses, although this is not explicitly articulated.

(36) G: When she's at home, she *shuttles* between the kitchen and the garden.

A: The plane *shuttles* from New York to London. (Dimković-Telebaković 2003: 188)

4. Conclusions

The results of the study confirm the hypothesis that Hüllen's (1981) three binary oppositions "+ / - own energy", "+ / - ground contact" and "+ / - telic" are necessary but insufficient to represent the internal structure of the motion verbs analysed here as they are used in air traffic English and general English. It was requisite to change Hüllen's binary opposition "+ / - normal" to "> / <" dangerous movement", because every movement in air traffic is potentially dangerous. This means that the symbols "+ / -", representing the presence or absence of risk, are not appropriate relative to this distinctive feature. The following six new distinctive features are identified: "→ / ← non-movement to movement transition or movement to non-movement transition" and "+ / - movement from one place to another", "+ / - directional movement" and "+ / - under control", and "∧ / ∨" speed" and "+ / - disrupted movement".

In regard to the classification of motion verbs in the ten tables, one can notice that the same lexemes occur in various tables. This confirms that motion verbs can have more than one distinctive feature. Further, some examples also show that certain verbs can take both "+ / -" symbols, which can be explained by the fact that verbs may signify various meanings, and can be transitive and intransitive (e.g. *ditch*, *abort*, *stall*, *dive*, *overrun* and *nosedive*). In view of these facts, one may object that the method employed here is

inconsistent. However, as the method used serves to represent the semantics of verbs, which is complex and sometimes contradictory, it is possible to claim that the modified CA suggested here is adequate to the purposes at hand, even if its unmodified version has been problematic as regards the description of speech sounds by followers of the Prague School. Ultimately, the symbols “ \wedge / \vee ”, “ $> / <$ ” and “ \rightarrow / \leftarrow ” are only possible solutions, but the distinctive features they symbolize clearly serve the analysis of motion verbs, as the definitions of the verbs examined here demonstrate.

The analysis also shows that, besides the semantic relations “correspondence”, “reflexive marking” and “reshifting” considered in Hüllen’s (1981) work, the semantic relations “reflexive marking and reshifting” (e.g. (33) and (34)) and “correspondence and reflexive marking” (e.g. (35) and (36)) can be established between some verbs of movement randomly chosen out of 54 motion verbs discussed in the first phase of the study. The latter two semantic relations are identified with regard to the distinctive features “ \wedge speed” and “+ under control”, and “+ telic” and “+ disrupted movement”.

Examples (29), (30), (33), (34), (35) and (36) illustrate that there are differences in the subject, semantic differences, which cause pragmatic differences, and that agency determines verbal meanings in general and specialist use. The analysis concludes that the difference between the agentive/instrument and objective/indirect objective (dative) is absent in the language of pilots. Examples (30A) and (35A) confirm that conciseness and economy of expression are typical of aviation radio communications.

The findings of the investigation may have teaching implications, and are of relevance to ESP practitioners and ESP L2 learners, to GE teachers and learners, and particularly to aeronautical and aviation students, pilots and air traffic controllers, and air traffic engineers who are interested in communicating in English as a second language. As the paper focuses on technical and semi-technical vocabulary related to the field of air engineering, it has the potential to contribute to the elaboration of terminological entries in reference works. The inclusion of the distinctive feature “+ / - own power” in the definition of the verb *nosedive*, for instance, seems to be necessary since nosediving mainly happens without a plane’s own power in civil aviation and often occurs with a plane’s own power in military aviation. By analogy to the verb *dive*, we propose that the definition of the verb *nosedive* is augmented by ‘under the external force of gravity or under its own power without the pilot’s control’ (cf. Appendix). Finally, the semantics and pragmatics of the verbs of movement examined can help us understand how the relation of

specialist language to the realities underlying it is encoded, and how such language differs from ordinary language in use. Metaphorical uses of terms are undoubtedly one of specialized language characteristics.

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