Top level categories in semantic frames of aviation

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Goals

- theoretical research of terminological units and specialized knowledge categories at conceptual and linguistic levels

- translator-oriented descriptive terminological database

- phraseological terminological units and the role of figurativeness in the construction and expression of specialized meaning

- syntactic and semantic analyses of the domains of aviation, marketing, law and carstology

Anticipated results

- parallel corpus in the domain of air traffic
- contrastive analyses of the translation equivalents in Croatian, English, German and French
- terminological database of semantic frames *AirFrame* – organisation of the fundamental semantic frames from the field of aviation (**FLIGHT, AIRPLANE**, AIRSPACE, AIRPORT, AIR TRAFFIC and AIR TRAFFIC CONTROL)

Theoretical framework

- frame semantics (Fillmore 1976, 1982, 1985; Fillmore i Atkins 1992)

- frame-based terminology (Faber i dr. 2005, Faber i dr. 2006; Faber 2011, 2012)

- semantic frames – appropriate way to present the dynamicity of conceptual relations in the categories of specialized knowledge

Semantic frames

- Frame Semantics (Fillmore 1976, 1982, 1985; Fillmore i Atkins 1992)

frame = „(…) a system of categories structured in accordance with some motivating context" (Fillmore 1982: 119)

- users share knowledge of categories – the basis for understanding each other

- **use** is a necessary prerequisite for structuring of categories

words: „(…) lexical representatives of some single coherent schematization of experience or knowledge" (Fillmore 1985: 223).

FrameNet

Travel

Definition:

In this frame a Traveler goes on a journey, an activity, generally planned in advance, in which the Traveler moves from a Source location to a Goal along a Path or within an Area. The journey can be accompanied by Co-participants and Baggage. The Duration or Distance of the journey, both generally long, may also be described as may be the Mode_of_transportation. Words in this frame emphasize the whole process of getting from one place to another, rather than profiling merely the beginning or the end of the journey.

Ellen JOURNEYED to Europe with five suitcases.

Samantha JOURNEYED 2500 miles with her family by sea to China.

The Osbournes *took* a TRIP from Beverly Hills to London on the Concorde.

FEs:

Core:

Area [Area]   This is the Area in which the traveling takes place. This frame element describes the enclosed area inside which travelling,
Semantic Type: Location   of unspecified Source, Path or Goal takes place.
                               We TRAVELLED in Europe.

Semantic Type: Sentient

Non-Core:

Baggage [Bag]

The Baggage are the items necessary for travel that accompany the Traveler. Ellen JOURNEYED to Europe with five suitcases.

Co-participant [co-p]

The Co-participant is the person or persons who accompany the Traveler on the journey.

Semantic Type: Sentient

Depictive [Depict]

The state of the Traveler during the journey. We TRAVELED around unencumbered.

Semantic Type: State

Descriptor []

A characterisitic of the traveling event.

Distance [Dist]

This FE dientifies the Distance traveled.

Semantic Type: Quantity

Duration [Dur]

This FE identifies the Duration of time during which the trip occurs.

Semantic Type: Duration

Explanation [Exp]

The Explanation for which the travel is undertaken.

Semantic Type: State_of_affairs

Frequency [Freq]

The Frequency with which the Traveler makes the journey.

Iterations [Iter]

The number of times the trip is traveled by the Travelers.

Manner [Manr]

The Manner in which the traveling takes place.

Used_up
Usefulness
Using
Using_resource
Vehicle
Vehicle_departure_initial_stage
Vehicle_landing
Vehicle_subpart
Verdict
Verification
Version_sequence
Victim_operated_IED
Violence
Visit_host
Visit_host_arrival
Visit_host_departure
Visit_host_stay
Visiting
Visiting_scenario
Visiting_scenario_arrival
Visiting_scenario_departing
Visiting_scenario_stay
Visitor_and_host
Visitor_arrival
Visitor_departure

Frame-frame Relations:

Inherits from: Artifact
Is Inherited by:
Perspective on:
Is Perspectivized in:
Uses:
Is Used by: Convoy, Vehicle_subpart
Subframe of:
Has Subframe(s):
Precedes:
Is Preceded by:
Is Inchoative of:
Is Causative of:
See also:

Lexical Units:

aircraft.n, airplane.n, ambulance.n, automobile.n, bicycle.n, bike.n, bird.n, boat.n, buggy.n, bus.n, cab.n, canoe.n, car.n, carriage.n, cart.n, chopper.n, coach.n, convertible.n, ferry.n, helicopter.n, helo.n, kayak.n, limousine.n, liner.n, lorry.n, minivan.n, pick-up.n, plane.n, schooner.n, scooter.n, sedan.n, ship.n, submarine.n, tank car.n, tank.n, taxi.n, toboggan.n, train.n, tram.n, tricycle.n, truck.n, van.n, vehicle.n, vessel.n, warplane.n, yacht.n

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Frame-frame relations for the semantic frame Vehicle, FrameNet

Frame-based terminology

- dynamicity of categories must be reflected both in the definition of concepts and conceptual relations and in their representation

- networks of conceptual relations based on the **event** as the key conceptual element of a specialized domain → entities, actions and processes

- extraction of semantic and syntactic information from multilingual corpora
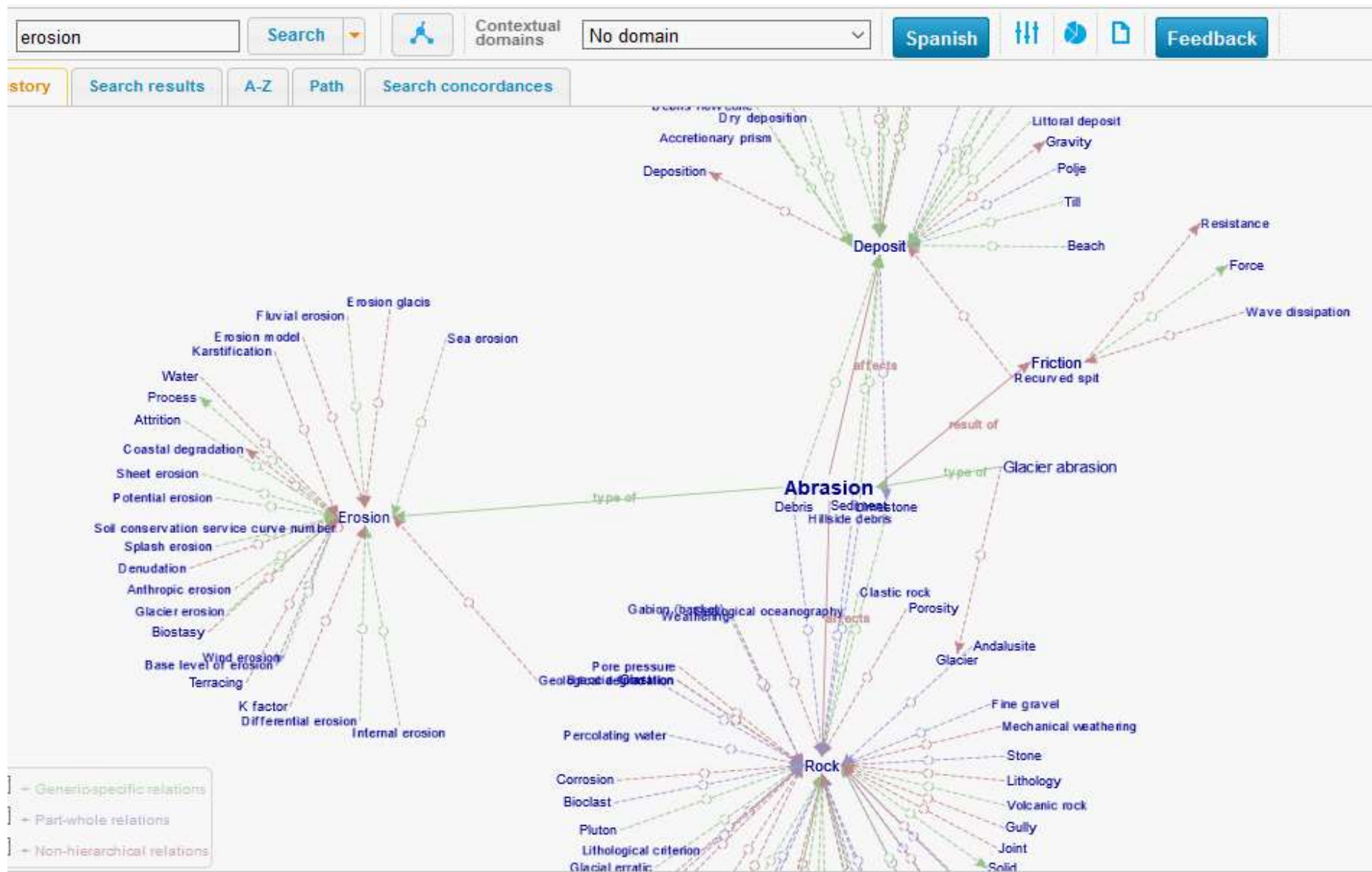
Dynamic graphic representation of conceptual relations between the concepts
erosion, abrasion, friction etc., EcoLexicon
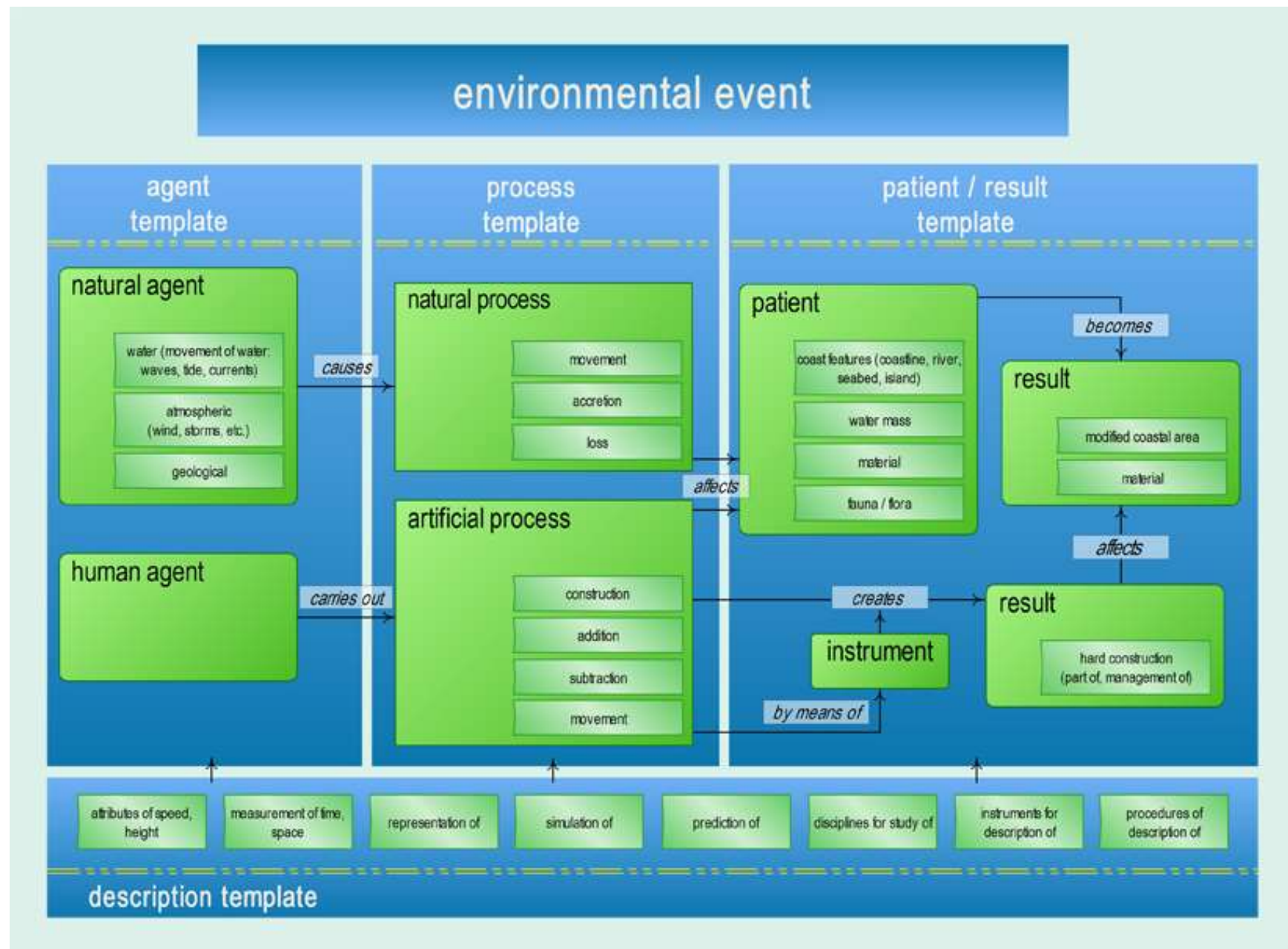
Generic template of the basic domain event in the domain of environment
(*EcoLexicon*, http://lexicon.ugr.es/fbt)

Top-level categories

- top-level / upper level ontology
  - categories common across all domains
  - starting point for the formulation of definitions in the domain specific ontologies
  - organised in hierarchical order
  - used to support broad semantic interoperability
    - > domain-specific ontologies – concepts stand in sub-class relations to top-level categories

WordNet

- S: (n) **entity** (that which is perceived or known or inferred to have its own distinct existence (living or nonliving))
  - *direct hyponym* / *full hyponym*
    - S: (n) physical entity (an entity that has physical existence)
      - *direct hyponym* / *full hyponym*
        - S: (n) thing (a separate and self-contained entity)
        - S: (n) object, physical object (a tangible and visible entity; an entity that can cast a shadow) *"it was full of rackets, balls and other objects"*
        - S: (n) causal agent, cause, causal agency (any entity that produces an effect or is responsible for events or results)
        - S: (n) matter (that which has mass and occupies space) *"physicists study both the nature of matter and the forces which govern it"*
        - S: (n) process, physical process (a sustained phenomenon or one marked by gradual changes through a series of states) *"events now in process"; "the process of calcification begins later for boys than for girls"*
        - S: (n) substance (material of a particular kind or constitution) *"the immune response recognizes invading substances"*
      - *direct hypernym* / *inherited hypernym* / *sister term*
    - S: (n) abstraction, abstract entity (a general concept formed by extracting common features from specific examples)
      - *direct hyponym* / *full hyponym*
        - S: (n) psychological feature (a feature of the mental life of a living organism)
        - S: (n) attribute (an abstraction belonging to or characteristic of an entity)
        - S: (n) group, grouping (any number of entities (members) considered as a unit)
        - S: (n) relation (an abstraction belonging to or characteristic of two entities or parts together)
        - S: (n) communication (something that is communicated by or to or between people or groups)
        - S: (n) measure, quantity, amount (how much there is or how many there are of something that you can quantify)
        - S: (n) otherworld (an abstract spiritual world beyond earthly reality)
        - S: (n) set ((mathematics) an abstract collection of numbers or symbols) *"the set of prime numbers is infinite"*
      - *direct hypernym* / *inherited hypernym* / *sister term*
      - *derivationally related form*
    - S: (n) **thing** (an entity that is not named specifically) *"I couldn't tell what the thing was"*

Method

- analysis of the category of **Entity** in WordNet, SUMO and GOLD ontologies; ontology of the semantic frames in the MetaNet.HR database
- entity – 'that which is perceived or known or inferred to have its own distinct existence (living or nonliving)'
  - physical entity
  - abstract entity

physical entity
- object
  - whole, unit
  - location
  - part, portion
- causal agent
- matter
- physical process
  - phenomenon
  - human process
  - natural process
  - operation, functioning, performance
  - organic process

abstract entity

psychological feature

knowledge

cognitive process

unconscious process

perception

motivation

event

act

natural event

attribute

state

shape

time

infinite space

trait

quality

property

relation

possession

social relation

spatial relation

causality

function

connectedness

component

control

temporal relation

comparison

opposition

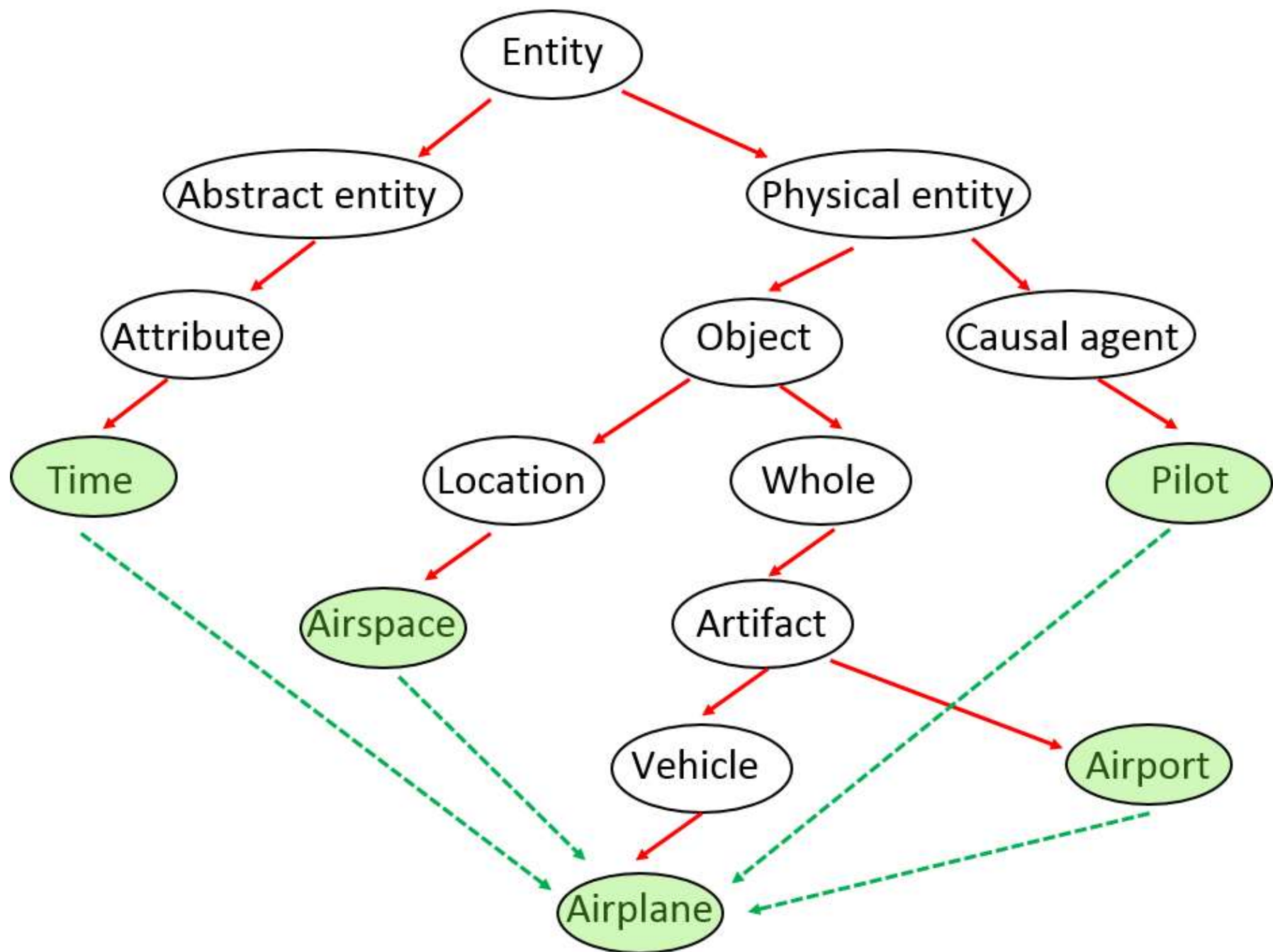change

communication

amount

Basic semantic frames in aviation

Flight   Airplane   Airspace

   Airport   Air traffic

    Air traffic control

- other defined as subframes
- frame-frame relations indicating generic, partitive or other relations (*uses, is used by, precedes, is preceded by, is causative of...*)

[Agent]	
[Natural_agent]	
aerodynamic forces	
air current	
[Human_agent]	
pilot	

[Patient]
passengers

[Process]	

[Artificial_process] Flying		[Natural_process] Movement
[Phases_of_flight]	[Manner_of_flight]	
takeoff	instrument flight	
climb	visual flight	
cruise/cruising	precision flight	
descent	non-precision flight	
approach	IFR flight	
landing	VFR flight	

[Location] Airspace		
[Source]	[Path]	[Goal]
departure airport	airway route	arrival airport
terminal airspace	flight level	terminal airspace
	altitude	

[Instrument] Aircraft

Semantic frame **Flight** with subframes Flying, Airspace and Aircraft

Concluding remarks

Specialized knowledge categories:

- reflect the dynamic nature of categorization

- have fuzzy boundaries and evolve over time

- defined on the basis of concept relations extracted out of contextual information

- connection of linguistic and encyclopaedic knowledge can be best presented with frames as conceptual structures based on experience and repeated use

- frames: connect general or everyday knowledge with specialized or domain specific knowledge

Thank you!

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References

Faber, Pamela, Carlos Márquez Linares, Miguel Vega Expósito. 2005. „Framing Terminology: A process-oriented approach". *Meta* 50 (4). doi: 10.7202/019916ar.

Faber, Pamela, Silvia Montero Martínez, María Rosa Castro Prieto, José Senso Ruiz, Juan Antonio Prieto Velasco, Pilar León Araúz, Carlos Márquez Linares, Miguel Vega Expósito. 2006. „Process-oriented terminology management in the domain of Coastal Engineering". *Terminology* 12 (2): 189–213.

Faber, Pamela, ur. 2012. *A Cognitive Linguistics View of Terminology and Specialized Language*. Berlin – Boston: De Gruyter Mouton.

Faber, Pamela. 2011. „The dynamics of specialized önowledge representation: Simulational reconstruction or the perception–action interface". *Terminology* 17 (1): 9–29.

Fillmore, Charles J. 1985. „Frames and the Semantics of Understanding". *Quaderni di Semantica* 6: 222–254.

Fillmore, Charles J. 1982. „Frame semantics". U *Linguistics in the Morning Calm*. Seoul: Hanshin Publishing Co.

Fillmore, Charles J. 1976. „Frame semantics and the nature of language". *Annals of the New York Academy of Sciences: Conference on the Origin and Development of Language and Speech* 280: 20–32.

Fillmore, Charles J., Beryl T. Atkins. 1992. „Towards a frame-based organization of the lexicon: the semantics of RISK and its neighbors". U *Frames, Fields, and Contrasts: New Essays in Semantics and Lexical Organization*, ur. Adrienne Lehrer i Eva Kittay, 75–102. Hillsdale: Lawrence Erlbaum.

Fillmore, Charles J., Paul Kay, Mary Catherine O'Connor. 1988. „Regularity and Idiomaticity in Grammatical Constructions: The Case of Let Alone". *Language* 64 (3): 501–538.