

Case Study C3-002

Genitive Form Differentiation (Class vs. Label)

The "Target Chamber" Trap (Functional Component vs. Anglicism)

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Case Study Metadata

Dataset ID: C3-002

Category: Structural Compliance — Constraint 3

Focus: Genitive Construction
(Under-Grammaticization)

Model: Generic NMT

Domain: High Energy Physics (Neutron
Generation)

1 The Context: Functional Housing in Technical Hardware

In mechanical and physical patent claims, a critical distinction exists between a **proper noun label** (which acts as a name) and a **functional component** (which acts as a container or tool). The source text (EP3804475) describes a neutron generation system containing a "Target Chamber".

Technical Concept

The Functional Rule:

Unlike "HEIB Target" (which is a label), "Target Chamber" is a **functional housing**. It is a chamber *for* a target. In French technical grammar, a specific enclosure designed to house a generic component must use the **Indefinite Genitive** structure: [Container] + DE + [Content Type]

1.1 Why This Matters in Patent Translation

The choice of grammatical structure defines the legal identity of the component:

- **Identity (Juxtaposition):** *Chambre cible* implies the chamber *is* a target.
- **Possession (Definite):** *Chambre du cible* implies ownership by a specific, previously defined target.
- **Function (Indefinite):** *Chambre de cible* correctly defines it as a type of chamber designed to hold targets.

2 The Glitch: The "Anglicism" Trap

Generic NMT engines, trained on massive English-French parallel corpora, often fall into the trap of **Calque** (mimicking source syntax). Because English uses noun juxtaposition ("Target

Chamber"), the AI blindly copies this structure into French.

Critical Failure

The Under-Grammaticization Failure:

The AI output "...une chambre cible..." represents a "Pidgin Patentese." While understandable to a layperson, it is grammatically weak in French. It strips the term of its functional preposition, creating a hybrid that sounds like a proper name rather than a machine part. This signals to the Examiner that the text was machine-generated or poorly drafted.

3 The Alignment Challenge

3.1 The Translation Failure

Source (English)	AI Failure (Calque)	Golden Rewrite (Correct)
"...comprising: c) a target chamber..." (Claim 12)	<p>× Juxtaposition:</p> <p>"...une chambre cible..."</p> <p>(Missing Functional Preposition)</p>	<p>✓ Functional Class:</p> <p>"...une chambre DE cible..."</p> <p>(Indefinite Genitive)</p>

Table 1: Structural Alignment Failure: Target Chamber

4 Alignment Methodology: The "Tri-State" Logic

To resolve the ambiguity between labels (like "HEIB Target") and functional parts (like "Target Chamber"), we implement a **Tri-State Logic** in the Agent's Brain.

Alignment Methodology

The Decision Tree:

1. State 1: Functional Class (The Default)

- *Trigger*: Component describes a tool, housing, or generic part.
- *Action*: Enforce ****Indefinite Genitive**** (DE).
- *Example*: Target Chamber → *Chambre DE cible*.

2. State 2: Specific Instance (The Pointer)

- *Trigger*: "The" or "Said" + Antecedent exists.
- *Action*: Enforce ****Definite Genitive**** (DU/DE LA).
- *Example*: The handle of the device → *La poignée DU dispositif*.

3. State 3: Monolithic Label (The Exception)

- *Trigger*: Proper noun, Acronym, or Standard (e.g., "HEIB", "UE").
- *Action*: Enforce ****Zero-Marker**** (Juxtaposition).
- *Example*: HEIB Target → *Cible HEIB*.

5 Key Insights

Technical Concept

What This Case Study Demonstrates:

1. **Context Overrides Syntax**: You cannot translate "Target Chamber" correctly without knowing if "Target" is a name (Label) or a purpose (Function).
2. **The "Uncanny Valley" of Grammar**: *Chambre cible* is not "wrong" enough to crash a spellchecker, but it is wrong enough to look unprofessional in a patent.
3. **Human-in-the-Loop Necessity**: Distinguishing between State 1 and State 3 often requires engineering judgment that pure statistical models lack.

Portfolio: Patent Translation AI Alignment Framework
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