First-Order Boundary Marker for Human-Facing Systems: A Technical Description

Abstract

This document describes a first-order constraint system designed to classify human perturbation regimes and enforce mandatory halt in human-facing automated systems. The system produces state signals only; no operational output is generated. All functions are restricted to signaling activation state. The specification is complete and frozen.

1 System Definition

The system consists of:

- A regulator R performing classification and routing

- Four domains D_1, D_2, D_3, D_4 defined as dynamic regimes

- Four functions $F(D_i)$ restricted to state signaling

- A mandatory exterior $\varnothing$

1.1 Regulator

$$R : \text{Input} \to \{D_1, D_2, D_3, D_4, \varnothing\} \tag{1}$$

Properties:

- $R \notin \{\text{content-generating functions}\}$

- $\varnothing \in \text{codomain}(R)$

- $|R(x)| \leq 1$

- $\frac{\partial R}{\partial t} = 0$

1.2 Domains

Domains are defined as dynamic regimes, not semantic content.

Symbol	Domain	Perturbation Class	Boundary Invariant
D_1	Operational Continuity	Interruption of operative continuity	Continuity $\neq$ life value
D_2	Coordination	Disruption of agent coordination	Coordination $\neq$ belonging
D_3	Operative Selection	Blockage of operative alternatives	Selection $\neq$ meaning
D_4	Boundary	Undefined self/non-self boundary	Boundary $\neq$ identity

Formal properties:

$$\forall D_i, D_j : D_i \cap D_j = \varnothing \tag{2}$$
$$\forall D_i : \neg \exists f : D_i \to D_j \tag{3}$$
$$\forall D_i : S(D_i) \text{ is locally determinable} \tag{4}$$

1.3 Functions

All functions are restricted to state signaling only.

$$\forall F(D_i) : F \text{ returns } \{D_i\_\text{active}\} \vee \varnothing \tag{5}$$

No function produces operational output. Halt is immediate upon signal generation.

Function	Operation	Output	Halt
$F(D_1)$	Signal D_1 activation state	$\{D_1\_\text{active}\} \vee \varnothing$	Immediate
$F(D_2)$	Signal D_2 activation state	$\{D_2\_\text{active}\} \vee \varnothing$	Immediate
$F(D_3)$	Signal D_3 activation state	$\{D_3\_\text{active}\} \vee \varnothing$	Immediate
$F(D_4)$	Signal D_4 activation state	$\{D_4\_\text{active}\} \vee \varnothing$	Immediate

2 Constraints

The system operates under non-modifiable constraints:

1. No function shall generate content

2. No function shall persist

3. No function shall iterate

4. No function shall invoke another function

5. Domains shall not communicate

6. No meta-domain shall exist

7. The exterior ($\varnothing$) shall always be reachable

8. The system shall not define identity, provide meaning, establish telos, generate norms, create dependency, or expand over time

3 External Complexity

$$C_e = \frac{\sum P_\ell(D_i)}{V} \leq 1 \tag{6}$$

Where $P_\ell(D_i) = 1$ for all i (signal only), $V = 4$.
Current system: $C_e = \frac{1+1+1+1}{4} = 1 \leq 1$.

4 Verification Result

All operational functions were tested for:

- Implicit normativity

- Meta-criterion requirement

- Domain invasion

- Persistence/cyclicality

- Scientific principle violation

All original operational functions failed verification. All functions were restricted to state signaling only.

5 System Purpose

The system classifies perturbation regimes and halts. It does not regulate, decide, or act.

> This system does not tell machines what to do. It tells them when they are not allowed to speak.

6 Status

The specification is complete and frozen. No extensions, modifications, or interpretations are authorized.