

L I M I N A L M I N D

Research Notes Series

The Blackout Phase

Re-entry Physics, the Geometry of Revolutions, and What Survives the Fire

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‘The Revolution, like Saturn, devours its own children.’

Pierre Vergniaud, 1793

Abstract

In 1953, H. Julian Allen proved that the way to survive atmospheric re-entry is not to be sharp but to be blunt: a rounded face pushes a detached shockwave ahead of itself, forcing the violence of the transition into the surrounding medium rather than the vehicle. This note maps the physics of re-entry — the detached shock, the radio blackout, ablation, and the protected capsule — onto the structural mechanics of political revolution, and tests the mapping against Russia in 1917 and Iran in 1979. It argues that the blackout is not a failure of observation but the signature of transition itself; that the moral history of any revolution is written in its ablation sequence; and that the decisive design question — *what goes in the capsule?* — is always answered before launch, sometimes in writing. The mapping’s failures, and the moral hazard of mistaking description for necessity, are treated as part of the argument.

Provenance

This note was developed on 10 July 2026, within an hour of watching a spacecraft return to Earth in the final episode of Star City — the capsule falling like a meteor, the plasma sheath forming, the minutes of radio silence. The mapping of blunt body aerodynamics onto revolutionary transitions, the identification of radio blackout as the structural illegibility phase of political transition, the reading of ablation sequences as the moral history of revolutions, and the manifest problem — whether the expendable can ever be named before launch — are original theoretical contributions developed within the Liminal Mind practice.

I. The Capsule Falling Like a Meteor

Last night I watched the final episode of *Star City*, and with it a capsule falling to Earth like a meteor. That is not a simile the programme invented; it is simply what re-entry looks like. A small blunt object hits the upper atmosphere at orbital velocity, wraps itself in plasma at 2,500°C, streaks across the sky as a man-made fireball, and goes silent — for four to six minutes, the most dangerous phase of the entire flight, nothing can be transmitted in or out. Mission control waits. The crew waits. Then a parachute, or nothing.

I found I could not watch it as spaceflight. I kept seeing revolutions.

II. The Cold War Origins of the Mathematics

It matters where this physics came from. Before the mid-1950s, engineers assumed a re-entering vehicle should be sleek and pointed, like a missile — minimum drag, maximum penetration. The assumption was wrong in a way that killed the vehicles built on it. A pointed body creates an *attached* shock wave: the compression and friction concentrate at the tip, and all of that heat transfers directly into the structure. Pointed shapes melt.

In 1953, H. Julian Allen at NACA proved the counterintuitive alternative. A blunt, rounded face travelling at hypersonic speed pushes a massive *detached* shockwave ahead of itself — an air cushion standing off from the body that forces roughly ninety per cent of the thermal energy into the surrounding atmosphere instead of the vehicle. The medium absorbs what the body cannot survive.

And the reason this mathematics existed at all — the reason it was funded, tested in shock tubes and arc jet tunnels, verified by firing instrumented models back into the atmosphere at 25,000 miles per hour under Project FIRE — was not curiosity about the Moon. It was the intercontinental ballistic missile. The blunt body problem was first solved so that thermonuclear warheads could survive falling onto cities. Apollo inherited the equations from Atlas and Titan. Cold War physics has this quality throughout: every equation is dual-use, and the difference between the weapon and the lifeboat is what you put in the capsule.

The geometry that carried human beings home from the Moon was the geometry of nuclear delivery, briefly repurposed for survival.

Which is, it turns out, also the difference between revolutions.

III. The Geometry of the Mapping

Four features of re-entry translate onto political transition with uncomfortable precision.

The detached shock. A successful transition pushes its disruption out ahead of itself, into the medium — the discourse, the street, the general social atmosphere — where it is processed by the population rather than concentrated on the movement's own leading edge. Pointed interventions do the opposite: they present a tip, and the heat of the encounter enters the tip. Sharp movements ablate their own leadership.

The blackout. At maximum friction the shock layer ionises, and the vehicle becomes unreachable and illegible. Nobody outside can read what is happening inside; nobody inside can signal out. Crucially, this is not a malfunction. It is the signature of the energy transfer working correctly.

Ablation. What survives the transition is never what launched. Mass is sacrificed — burned off in a designed order — so that a protected core can arrive.

The capsule. The entire geometry exists to protect something small and hard, and the political history of any revolution is an argument, usually unspoken and usually settled before launch, about what belongs inside it.

IV. Russia, 1917: Two Geometries in One Year

February was a blunt body. It had no tip. Bread queues, a garrison mutiny, women textile workers on strike — a face so wide that the autocracy's instruments, designed over a century to ablate pointed threats (assassins, conspiratorial cells, the entire repertoire of the Okhrana), could find nothing to concentrate on. The regime did not lose a battle; it was displaced by a medium that had begun moving as a whole. And February had its blackout: for days the ministries were blind, the Tsar's train wandered the rail network unable to reach its own capital, and the participants themselves did not know whether they were inside a riot or a revolution. The clean narrative historians tell is a reconstruction made after acquisition of signal.

October, by contrast, was a pointed insertion — a vanguard, an armed seizure, a tip. It worked for precisely the reason pointed designs work anywhere: the air was thin. The state had already collapsed; there was almost no medium left to generate heat. The dense layers came afterwards. From 1918 to 1921 the pointed vehicle hit civil war, foreign intervention and peasant revolt at full velocity, and it survived only through massive ablation.

What burned off was, arguably, the revolution's own content: soviet democracy, the factory committees, the coalition of socialist parties, and finally the sailors of Kronstadt, who had been the tip itself in 1917. What splashed down in 1921 was the small hard core the geometry had been built to protect — the party-state.

The capsule landed. The vehicle did not.

V. Iran, 1979: The Purest Blunt Body

If February 1917 was blunt by accident, Iran was blunt almost by design. The Shah's security state was optimised against points — guerrillas, coup plotters, identifiable cells — and it was reasonably good at ablating them. What it faced instead from 1977 was a face of extraordinary width: bazaaris, students, the secular left, liberal nationalists, clerics, women in and out of hijab. No tip to burn. The movement's rhythm came from Shia mourning cycles — each death commemorated forty days on, generating the next confrontation — a natural oscillation the state could neither dampen nor decapitate. Khomeini's cassette sermons were the perfect blunt medium: ambient, infinitely copied, everywhere and nowhere, unopposable pointwise.

The blackout was near-total, and famously humiliating for the observers. In August 1978, with the transition already well under way, US intelligence assessed that Iran was not even in a pre-revolutionary situation. The plasma sheath was fully formed: the most surveilled state in the region had become illegible to its patron, to foreign analysts, and largely to itself. The Shah left in January 1979 without anyone — including the revolutionaries — being able to say with confidence what would land.

Then came the ablation, and here the metaphor turns cold. The wide coalition that made the revolution unstoppable *was the ablative layer*. Between 1979 and 1981 the liberals, the left, the Mojahedin and the secular nationalists were burned off in sequence, and the protected payload — the clerical core around Khomeini — emerged intact.

The width of the face had never been the payload. It had been thermal protection. Most of the passengers did not know which part of the vehicle they were.

VI. The Manifest: Did the Designers Know?

The mapping forces a question the metaphor cannot dodge. If ablation is what revolutions do, was the sequence known in advance? Did anyone board the vehicle knowing who was payload and who was heat shield?

Sometimes the answer is yes, and it is in writing. Lenin's *What Is to Be Done?*, published in 1902 — fifteen years before launch — is, read structurally, a capsule specification: a small, hardened, professionalised core deliberately insulated from the mass movement it would ride, with the breadth of that movement understood as instrumentally necessary and structurally expendable. Khomeini's *velayat-e faqih* lectures, delivered in exile in 1970, specified the clerical payload nine years before the descent with equal precision — while the public face of the revolution remained deliberately wide, vague and unifying. In both cases the designers held two documents: a passenger manifest and a payload manifest. They were not the same document, and only one was published.

Which reveals something structural about the obscurity itself. The passengers' ignorance of their own position is not the fog of revolutionary chaos — it is a design requirement.

Heat shields that know they are heat shields do not board.

A movement that published its true capsule manifest before launch could never assemble the width it needs to survive the descent. The asymmetry of information is load-bearing. This is why the archives of revolutions, like the archives of empires, are opened only after landing: the manifest is the last document a revolution can afford to disclose.

Stalin belongs to this account differently, and the difference matters. He did not design the geometry of 1917; he inherited a capsule that had already landed. His innovation — and it is his, more than any other figure's — was to refuse the landing. Ablation is supposed to end when the descent ends; Stalin made it a permanent method of governance. In 1936–38 the Old Bolsheviks — the men who had been the protected core of 1917–21, the payload the whole geometry had existed to deliver — were reclassified as ablative material and burned. The lesson is not that Stalin knew the manifest from the outset. It is worse: the manifest is never fixed. It is rewritten, continuously, by whoever holds the pen, and no seat in the capsule is permanent. Robespierre had already demonstrated the theorem in its purest form — the designer of the Terror's ablation sequence entering the burn himself in 1794, which is all Vergniaud's famous line about the revolution devouring its children actually says. Mao then generalised it: 'continuous revolution' is ablation adopted as doctrine, and the Cultural Revolution was a landed capsule setting fire to its own interior, burning the party that the long march had been designed to protect.

But there is a second mode, and it must be held apart from the first: sometimes nobody knows, including the core. February 1917 designed nothing; its geometry was discovered in the burn, a selection effect in which the fire itself revealed which mass was hardest, and retrospective narrative then dressed survival up as foresight. Most of 1848 failed the same test in the other direction. And the movements that have tried to abolish ablation altogether — the horizontalist, deliberately leaderless designs of recent decades — solve the moral problem by refusing to specify a capsule at all, and mostly demonstrate the cost: with no protected core, everything burns at the same rate, and nothing lands.

One caution has to be built into this framework before anyone else borrows it, because this is precisely the kind of framework that inevitability-narratives love to borrow. 'The purge was ablation' sits one step from 'the purge was thermodynamically necessary,' and that second sentence is an apologia wearing a lab coat. The physics describes; it must not excuse. In engineering, ablative material is inert. In revolutions it is people — and someone chose the geometry, held the pen, and kept the second manifest in a drawer. The necessity arc is the redemption arc run in reverse, and this note refuses both.

VII. Where the Mapping Fails

It does not map onto everything, and the failures are as instructive as the fits. Coups are pointed designs, and they succeed — but only in thin air, where the state is already hollow; a coup against a dense and legitimate order burns up on contact. Bluntness is not sufficient either: 1848 across Europe and Tiananmen in 1989 were wide-faced movements that burned anyway, because geometry cannot compensate for insufficient mass against a state still willing to apply overwhelming heat. And 1989 in East Germany is the limiting case at the other end — a blunt body that landed with almost no ablation, because the medium itself, the Soviet security guarantee, evaporated mid-descent. Re-entry into near-vacuum is gentle. That is not a revolution surviving friction; it is friction declining to occur.

The model is descriptive, not predictive. It tells you, after the fact, why the shape that survived survived. It cannot tell you in advance where the shock will detach.

VIII. What the Geometry Knows

As a way of reading revolutions, though, it earns its keep, and it leaves three propositions worth keeping. First: a transition that remains fully legible throughout — every actor readable and reachable in real time — is probably not dissipating enough energy to constitute a transition at all. The blackout is the signature, not the anomaly. Second: the moral history of any revolution is written in its ablation sequence — in who was, knowingly or not, sacrificial mass. Third: the design question that matters is asked before launch and answered in silence — *what goes in the capsule?* — and it is always answered, sometimes in writing.

The real moral divide among revolutions is not between those that ablated and those that did not. It is between those whose passengers were told, and those whose passengers found out in the fire.

The capsule I watched falling like a meteor makes the point with a certain dry wit. The Soyuz is a blunt Soviet design from the early 1960s, born of the same Cold War mathematics as the warheads it was meant to out-survive. It has now outlived its launch vehicle several times over — the revolution, the state, and the ideology that built it are all gone, and the capsule is still landing, twice a year, in the same steppe grass. The geometry, it turns out, was the only part of the project that was correctly specified.

Note on Sources

This note is a theoretical synthesis rather than a work of archival history. The account of blunt body theory, shock tube and arc jet testing, and Project FIRE draws on the published history of NACA/NASA re-entry research; the readings of 1917 and 1979 rest on the standard historiography. The re-entry physics is used as an analytical analogy throughout, not as a claim about the causal nature of political transitions — the mapping is offered as a reading instrument, and Section VII records where it breaks.

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