Mechanica Imperii — Expanded Design Document

This version integrates the original scope with additional planned extensions, structured under each major system heading.

# 1. Engine & Runtime

* Stable SDL2 + OpenGL runtime with ImGui UI.
* Save/load, simulation ticks (hourly/daily).
* Main menu, HUD panels, pause/resume, speed controls.
* Planned Extensions:
* - Timeline Replay: a 'history book' panel to review decades of gameplay.
* - Advisor Reports: daily/weekly summaries written in the tone of councilors.
* - Dynamic Tooltips: show causal chains of events (e.g., famine → unrest).

# 2. Geography & World

* High-res Europe map (4901×4251).
* Terrain grid at 1m zoom, stylized map at higher zoom levels.
* Weather, fog of war, line of sight mechanics.
* Planned Extensions:
* - Natural Disasters: earthquakes, floods, volcanic eruptions.
* - Climate Cycles: Medieval Warm Period, Little Ice Age.
* - Migration Waves: large-scale displacement from war, famine, plague.

# 3. Population & Society

* Population types: classes, cultures, religions.
* Populations consume, produce, revolt, die, migrate.
* Demographics directly affect economy and manpower.
* Planned Extensions:
* - Literacy & Information Flow: impacts tech adoption, propaganda.
* - Guilds & Urban Politics: guild factions drive urban unrest and policies.
* - Festivals & Public Life: stability boosts, treasury costs.
* - Epidemics with cultural effects (rise of sects, superstition).

# 4. Mesh Systems

* Administrative Mesh: efficiency of central control.
* Trade Mesh: dynamic routes, piracy, blockades.
* Espionage Mesh: visibility, interception, secrecy.
* Cultural & Religious Mesh: assimilation, faith spread.
* Rural Mesh: agricultural productivity, devastation.
* Supply Mesh: army logistics, attrition.
* Planned Extensions:
* - Smuggling Networks: bypass blockades, taxation.
* - Hybrid Cultural Practices: syncretism reduces unrest but alters identity.
* - Logistics Infrastructure: buildable depots and wagon trains.

# 5. Military

* Armies evolve from levies to modern forces (1000–1900).
* Delayed orders, fog of war, terrain/weather effects.
* Unit honors and legendary units tracked.
* Planned Extensions:
* - Mercenary Companies: independent entities, may defect if unpaid.
* - Officer Corps: generals with traits, careers, loyalties.
* - Military Innovation Spread: neighbors copy unit types/doctrines.
* - Logistics & Supply Depots: explicit supply structures for armies.

# 6. Naval

* Naval tech tree with fleets, blockades, piracy.
* Shipyard buildings, ports, naval economy integration.
* Planned Extensions:
* - Naval Crew Quality: morale, loyalty, potential mutiny.
* - Privateering Licenses: letters of marque affect economy and diplomacy.
* - Naval Trade Companies: fleets that evolve into semi-autonomous factions.

# 7. Espionage & Intrigue

* Agents perform missions: sabotage, assassination, coups, propaganda.
* Espionage log/history, suspicion meters, counter-espionage.
* Planned Extensions:
* - Espionage Economy: agents can be bribed by rivals.
* - Blackmail: spies uncover scandals to sway nobles or councilors.
* - Disinformation Campaigns: fake news destabilizes enemy realms.

# 8. Royal Council, Factions & Politics

* Royal council roles: advisors, faction loyalties, coups, scandals.
* Factions: nobility, clergy, burghers, peasants, military.
* Planned Extensions:
* - Dynastic Marriages: alliances, claims, and succession crises.
* - Legal Codex: layered laws (feudal, religious, codified).
* - Bureaucracy Simulation: corruption risk as centralization grows.

# 9. Events & History

* Branching historical events: Hundred Years' War, Reformation, Dutch Revolt, etc.
* Political, economic, military, cultural, and religious events.
* Planned Extensions:
* - Character-Driven Events: scandals, duels, romances.
* - Parallel Histories: alternate outcomes for major wars/reformations.
* - Cultural Golden Ages: unlock unique art, science, prestige effects.

# 10. Technology

* 8 technologies per era (1250–1900).
* Unlocks: units, doctrines, reforms, espionage visibility.
* Planned Extensions:
* - Technology Diffusion: innovations spread along trade/cultural networks.
* - Patronage of Science/Arts: funding accelerates certain branches.
* - Tech Theft Expansion: espionage contributes partial progress.

# 11. Economy & Trade

* Dynamic goods flow based on production, demand, blockades.
* Buildings produce/consume, trade routes optimized dynamically.
* Planned Extensions:
* - Financial Instruments: banks, loans, bankruptcy risk.
* - Insurance: for trade fleets vs piracy/storms.
* - Resource Depletion: mines and forests can run dry.
* - Black Markets: smuggling networks outside crown control.

# 12. AI Behavior

* AI decisions guided by doctrines, diplomacy, economy.
* AI has espionage, council, and factional logic.
* Planned Extensions:
* - Doctrinal AI Styles: Militarist, Diplomatic, Mercantile, Religious.
* - Espionage Personalities: aggressive vs passive spy states.
* - Long-Term Memory: AI remembers betrayals for decades.