# Ark Station — Crisis Management Simulator Game Design Document

## 1. High-Level Overview

**Ark Station** is a finite, text-first Crisis Management game designed to be completed in a single playthrough of approximately **20 minutes**. The player is an awakened technician aboard a derelict Ark Ship that has docked with a station in a rapidly decaying orbit around a volatile star.

Both the **Ark Ship and the station are critically damaged**. The station suffered a catastrophic, unanticipated environmental failure and is now falling into the sun. Radiation spikes are melting through the hull. The systems are failing.

The player must not only repair the station and get it back online, but they must balance resource allocation between systems to keep the station from falling into the sun while attempting to preserve as many lives as possible.

Thousands of humans remain in stasis aboard the Ark Ship. Their survival depends on the player's ability to allocate limited power, restore system integrity, and slow the rate of ongoing degradation. The game is intentionally:

- **Failable**
- **Finite** (no prestige, no endless mode)
- **System-driven** rather than content-heavy
- **Cold in tone**, relying on technical system readouts instead of emotional narration

The core experience is about **resource allocation under irreversible constraints**.

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## 2. Design Goals

### Primary Goals

- Create a complete experience with a real ending
- Ensure all mechanics reinforce the narrative
- Maintain tight scope suitable for a first project
- Encourage meaningful, morally weighted decisions

### Explicit Non-Goals

- No prestige mechanics
- No infinite scaling
- No complex visuals or animations
- No branching dialogue or character systems

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# 3. Narrative Frame

## Premise

The player was a technician aboard an Ark Ship sent to seed a new solar system. After a catastrophic failure, they awaken early to find the Ark Ship critically damaged. Emergency procedures allow docking with the destination space station.

The station, however, is not merely offline. It is falling into the sun and radiation spikes are causing the station to degrade rapidly.

The player must:

- Maintain stasis pod life support
- Restore and stabilize failing systems
- Counteract ongoing environmental degradation
- Use orbital thrusters to move the station away from the sun
- Restore the station enough to awaken the survivors

The station has no personality. It communicates only through **technical status reports, warnings, and logs**. It never judges the player's actions.

Meaning and emotion emerge entirely from the player's choices and outcomes.

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# 4. Core Design Pillars

1. **Finite Lives** — Every survivor lost is permanent
2. **Power as Allocation** — Power is never spent, only reassigned
3. **Ongoing Decay** — Systems lose integrity over time. This increases during radiation spikes.
4. **Knowledge Has a Cost** — Learning consumes time and accelerates loss
5. **Automation Is Earned** — Stability must overcome decay

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# 5. Resource Model

## Primary Resources (Always Visible)

### 5.1 Power

- Represents total reactor output as a percentage
- Allocated to systems in **1% increments**
- Always finite at any moment
- Power is reassigned, not consumed

Power allocation directly affects:

- System functionality
- Repair speed
- Survivor loss rate

At game start, total available power is **5%**.

(Player can unlock ability to over-clock the reactor, but this causes rapid Integrity damage to the Reactor Core itself.)

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### 5.2 Stasis Pods (Survivors)

- Exact number always visible
- Continuously decreases
- Rate of loss depends on:
    - Power allocated to Stasis Support
    - Integrity of the Stasis Support system
    - Indirectly, how much time-consuming actions are taken

This value functions as both:

- The player's **score**
- The determinant of narrative ending

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## Secondary Resources (Efficiency Modifiers)

### 5.3 Knowledge

- Exists only as **discrete unlocks**
- Each unlock immediately consumes time

- Time cost results in additional stasis pod failures
- Unlocks new capabilities, efficiencies, or systems

Examples:

- Reactor calibration procedures
- Drone coordination algorithms
- Radiation mitigation protocols

Knowledge is irreversible and permanent.

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### 5.4 Integrity

- Exists as a **percentage for each system**
- Represents system health and resistance to degradation
- Higher integrity:
  - Improves efficiency
  - Reduces power waste
  - Unlocks functionality

Integrity is never spent and cannot be transferred between systems.

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# 6. Distance to Roche Limit and Radiation Damage

- Distance to Roche Limit is the station's distance from the sun. Particularly the point of no return where no amount of available thrust can save them from falling in completely.
- Constantly decreases unless player allocates energy to the thrusters.
- 3 levels of distance (Close, Medium, Far)
- Closeness determines level of intensity of radiation spikes.


- All systems are affected by ongoing radiation spikes and low level radiation damage
- If unmaintained, integrity slowly decreases over time, and increases more quickly during spikes
- High integrity and sufficient power allocation to radiation shields can slow or halt decay

This ensures the player is always fighting **entropy**, not just rebuilding once.

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# 7. System Architecture

The entire game is built around **five systems**.

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## 7.1 Reactor Core

**Purpose:** Power generation

- Produces total available power (percentage-based)
- Starts at minimal output
- Maximum output increases through:
    - Knowledge unlocks
    - Integrity improvements

Special behavior:

- Suffers degradation if overstressed
- Low integrity reduces effective output

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## 7.2 Stasis Pod Life Support System

**Purpose:** Preserve human lives

- Continuously consumes power
- Has integrity
- Lower integrity increases pod failure rate
- Environmental degradation directly impacts this system

This system is always active. The player only controls **how well** it operates.

Vulnerability: Highly susceptible to Radiation
- The Cryo-Log: When this system takes damage, a text log updates in the corner.
- "Pod 402 Failure: James Dornan.  Age: 42.  Role: Technician.  Cause of death: Thermal Liquefaction."
- "Pod 991 Failure: Aria Mandrin. Age: 8. Role: Child. Cause of Death: Severe Radiation Hemorrhaging."

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## 7.3 Repair Drones

**Purpose:** Automation and system recovery

- Consume allocated power
- Gradually restore integrity to selected systems
- Player assigns repair priorities

Repair drones are the primary counter to radiation damage.

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### 7.4 Orbital Thrusters

**Purpose:** Moves the station further away from the sun.

Input: Power
Function: Counteracts gravity
Mechanic:
- Low Power: Station falls closer to the sun
- Medium Power: Station maintains orbit
- High Power: Station pushes away from sun

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### 7.5 Solar Shield Matrix

Input: Repairs (From Drones)
Function: Mitigation percentage (e.g. 100% integrity blocks 90% of radiation)
Decay: Takes heavy damage during Solar Flares

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# 8. Power Allocation Model

- Total power output is represented as a percentage (e.g. 25%)
- Power is allocated in **1% increments** (Upgradeable to 5,10,20% increments via upgrades)
- Each system has a power allocation control

Constraints:

- Total allocated power cannot exceed total output
- Unallocated power is wasted

As the Reactor Core improves, the player gains more allocation points, increasing strategic complexity.

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# 9. Time Mechanics

## Time Flow

- Time advances continuously when unpaused
- The passage of time is felt through system integrity decay and survivor loss

## Time Costs

Certain actions immediately advance time, causing:

- Additional system degradation
- Additional stasis pod failures

Examples:

- Learning new knowledge
- Emergency system reboots
- Forced recalibration procedures

Time cannot be recovered directly.

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# 10. Core Gameplay Loop

1. Systems degrade over time due to radiation damage
2. Survivors are lost
3. Power is insufficient
4. Player allocates power
5. Player chooses:
    - Repair priorities
    - Knowledge unlocks (time cost)
6. Integrity improves
7. Efficiency increases
8. Degradation slows
9. Survivor loss rate stabilizes
10. Outcome locks in

**Solar Spike Loop:**

Calm Phase: Solar activity is low. Player balances Orbit vs. Repair.

Warning: "Solar Forecast" predicts a Flare in 30 seconds.
Preparation:
- Player diverts power to Drones to patch Shields.
- Player pushes Thrusters to gain distance (safety buffer).
- Player initiates "Overdrive" on Reactor to afford both.

Impact (The Flare):
- Radiation spikes.
- Shields take damage. Leads bleed through to Stasis.
- "Cryo-Log" streams deaths as they happen
- Reactor integrity drops due to Overdrive.

Recovery:
- Flare ends. Player disables Overdrive.
- Player attempts to restore systems before next spike.

**The "Knowledge" Gamble:**

Every time the player chooses to learn a new technology, time speeds up. If there is an emergency during this time, they will be forced to make a decision.

If the Player is smart and times their learning well, they can avoid most of the negative events.

E.x. The player realizes they need the "Advanced Cooling" unlock to survive the next flare. They click Learn (game speeds up for a set amount of time).
- A small asteroid hits the Thrusters during the fast-forward.
- Player is alerted and must make a decision: Abort research (lose some percentage of their progress to mitigate thruster integrity damage) OR Hold the line (finish research, orbital distance decays).

# 11. User Interface Layout

## Single-Screen Layout

**Top Panel:**

- Cold system log
- Status messages and warnings

**Center Panel:**

- Power (Total / allocated)
- Buttons for player to generate power as well as allocate between systems

- ○ Power Control: [-] [+] and a [MAX] button.
- Readout for each system showing Integrity, Power allocation, Efficiency, and Status Text: (e.g., "Overheating", "Active", "Offline").
  - ○ Reactor
  - ○ Stasis Pods
  - ○ Repair Drones
  - ○ Orbital Thrusters
  - ○ Solar Shield

**Side Panel:**

- Survivors remaining (exact number)
- Radiation levels
- Distance to Roche Limit
- Button to enter Research/Knowledge window

**Research/Knowledge Window:**

- Lists available protocols
- When choosing to research, displays warning
  - [UNLOCK AUXILIARY COOLING]
    Benefit: Reactor Decay reduced by 30%.
    Cost: 120 Seconds of Simulation Time.
    WARNING: Based on current decay rates, this action will result in approximately -4.5% System Integrity loss across the board and 142 Casualties.
    [EXECUTE?] [CANCEL]

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# 12. Endings and Outcomes

Final outcome is determined by **percentage of survivors saved**.

- **90%+** — Best Ending: Flourishing civilization
- **50–89%** — Good Ending: Divided but stable society
- **30–49%** — Survived Ending: Struggling, fragmented future
- **<30%** — Bad Ending: Collapse and execution
- **0%** --- Terrible Ending 1: There's no one left to save.
- **Fell past Roche Limit:** Station falls into the sun.

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# 13. Failure Conditions

- All survivors perish
- Station falls past Roche limit

Failure results in immediate game end.

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# 14. Scope Constraints (Hard Rules)

- No new resources beyond those defined
- No prestige or replay loops
- No additional systems
- Text-first presentation only

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# 15. Design Intent Summary

Ark Station is a game about entropy, responsibility, and triage. The station is dying. People are dying. The player's task is not to achieve perfection, but to **slow the collapse enough to give humanity a future**.

Completion, not mastery, is the goal.

# 16. Example of player experience

**Beat 1:** Introduction
- Initial text describing the player's situation
- Player presses button 10x to start up reactor in emergency mode
- UI comes online showing systems, but most are inactive

**Beat 2:** Player must perform an initial loop of learning a technology which allows them to connect the reactor to the Stasis Pods.
- Stasis Pods are not connected to the station.
- Only one research option available.
    - UI shows projected casualties before research begins.
    - "Estimated casualties during initialization: 90–160."
- Player must choose to research it in order to proceed.

- Time speeds up visibly
- Casualties occur in the process.
- This teaches the "speed-up" mechanic as well as sets the tone that there is no easy decision to make and the player will have to sacrifice people when making decisions.
- After research is complete, show a brief comparative log:
    - "Stasis Pod Support System Online.
    - Casualties during initialization: 137"

**Beat 3:** Power Expansion + Repair Drones
- After this, the game begins to open up one system at a time. First bringing the Reactor to a higher power state, then activating the repair drones. This feels like a win because now the player can increase integrity to systems.
    - Player can point Repair drones to Reactor, Stasis Pods, Repair Drones. All are capped at a low level like 20% max integrity.
- The player must research a "hacking" technology to provide themselves authority to access higher-level systems and upgrades. This also reveals that the authority necessary to open the Stasis Pods is locked behind the last upgrade.
    - "Ark Station control systems require Command Authorization Level 7.
    - Current authorization: Level 2 (Emergency Technician)."

**Beat 4:** Solar Flare
- While researching the Command Authority Level 3 upgrade, a solar flare hits the station.
- The first solar flare hits and causes the integrity of Stasis Pods to decline, killing more people.
- The player can now repair the solar shields, but is unable to reposition them or access the Solar Forecast until Command Authority Level 4.
- Upgrades can be researched bringing systems up to 40% max integrity.

**Beat 5:** Sunshine
- After researching Command Authority Level 4, the player has authority to reposition the shields and can view the Solar Forecast.
- Upgrades can be researched bringing systems up to 60% max integrity.

**Beat 6:** Freefall
- When the player upgrades to Command Authority Level 5, they discover the station is falling into the sun.
- The player must repair and utilize the thrusters to move the station far enough out that they don't fall past the Roche Limit.
- Upgrades can be researched bringing systems up to 100% max integrity

**Beat 7**: Endgame
- The final Command Authority unlock necessary to open the Stasis Pods requires the player to lock themselves out of being able to handle any disaster for a significant period of time, thus requiring the station to be in a good state when they do it.

- WARNING: COMMAND OVERRIDE SEQUENCE
During this operation:
– Manual control will be unavailable
– Emergency responses will be disabled
– All systems will operate at current allocation

Based on current projections:
• Expected casualties: 312–1,140
• Probability of orbital failure: 18%

[PROCEED] [DELAY]