H-OBS/R-SPAR Experiment Deployment Schedule

Total Duration: 44 Working Days **Objective:** Complete all experiments defined in `DELIVERABLES.md`, ensuring reproducibility and meeting performance targets for IEEE T-SMC-S submission.

Schedule Overview

Phase	Duration	Key Objectives	Verification Point
1. Prep & Reproduction	Days 1-15	Environment setup, baseline reproduction, code readiness.	**VP1:** All 7 methods run successfully.
2. Core Experiments	Days 16-35	Full training on ImageNet-1k, hyperparameter tuning.	**VP2:** All metrics meet `DELIVERABLES.md` targets.
3. Analysis & Polish	Days 36-44	Ablations, cross-platform tests, documentation, packaging.	Final Submission Package ready.

Detailed Daily Schedule

Phase 1: Preparation & Baseline Reproduction (Days 1-15)

Goal: Ensure all code is executable and baselines are reproducible.

Days	Task Category	Specific Actions	Deliverables
1-3	**Environment**	- Setup Docker container `hobs-rspar:latest `- Prepare ImageNet-1k (download, verify md5) ` `- Configure GPU drivers & CUDA 12.x	- Docker Image` `- Verified Dataset
4-8	**Baselines**	- Implement/Verify `DepGraph`, `JTP`, `Bi-Level`, `StructAlign`, `UDFC `- Run "dry-run" tests (2 epochs) for each to verify pipeline.	- Baseline Training Logs (Dry Run)` `- Baseline Checkpoints (Init)
9-12	**Core Method**	- Finalize `H-OBS` sensitivity analyzer.` `- Finalize `R-SPAR` RL agent logic.` `- Implement `Block-ELL` custom kernels.	-`models/hobs.py `- `models/rspar.py `- `utils/cuda_optimizers.py`
13-15	**VP1: Code Freeze**	-**Verification Point 1:** Run full pipeline for all 7 methods on 10% data subset.` `- Fix any runtime errors or OOM issues.	-**VP1 Report:** All methods runnable.` `- `scripts/reproduce.sh` verified.

Phase 2: Core Experimentation & Optimization (Days 16-35)

Goal: Achieve target metrics on ResNet-50, MobileNetV2, and EfficientNet-B0.

Days	Task Category	Specific Actions	Deliverables
16-22	**ResNet-50 (Baselines)**	- Full training of 5 baselines on ResNet-50 (ImageNet-1k). - Parallel execution on available GPUs.	- Table 1 Baseline Rows - Baseline Logs/Models
23-27	**ResNet-50 (Ours)**	- Full training of**H-OBS/R-SPAR** on ResNet-50. - Hyperparameter fine-tuning (if needed) to hit **75.96% Acc / 3.10x Speedup**.	- Table 1 "Ours" Row - Best Model Checkpoint
28-30	**Lightweight Models**	- Run MobileNetV2 & EfficientNet-B0 experiments (Ours vs Best Baseline). - Verify latency targets on mobile-like settings (if simulated).	- Table 2 & 3 Data - Lightweight Model Checkpoints
31-33	**Optimization**	- Integrate TensorRT (FP16). - Profile and optimize `Block-ELL` kernels. - Measure Latency/Throughput/Energy on primary GPU.	- Table 13 & 14 Data - Optimized Kernels
34-35	**VP2: Metric Audit**	-**Verification Point 2:** Compare all collected results against `DELIVERABLES.md` targets. -**CRITICAL:** If targets missed, trigger emergency tuning (weekend work).	-**VP2 Report:** Pass/Fail on Targets. - Updated `DELIVERABLES.md`

Phase 3: Analysis, Cross-Platform & Final Polish (Days 36-44)

Goal: Deep analysis, ablation studies, and submission packaging.

Days	Task Category	Specific Actions	Deliverables
36-38	**Ablation**	- Run Module Ablation (w/o Hessian, w/o RL, etc.). - Run Sensitivity Analysis (Table 8). - Run Stability Analysis (Table 11).	- Tables 7-11 - Figs 2, 3, 4
39-40	**Cross-Platform**	- Deploy models on RTX-5090, H100, A100, V100. - Measure real-world latency and speedup.	- Table 4 Data - Cross-platform logs
41-42	**Visualization**	- Generate Feature Map Reconstruction Error (Fig 1). - Plot all charts (Matplotlib/Seaborn). - Finalize all tables in LaTeX/Markdown.	-`docs/figures/*.png` - Final Tables
43	**Documentation**	- Complete `README.md`, `API.md`, `EXPERIMENTS.md`. - Clean code (remove comments, format).	- Completed `docs/` folder - Cleaned Source Code
44	**Submission**	- Build Docker image. - Package Anonymous Code. - Compile Supplementary Material PDF.	**-Final Submission Package**

Resource Requirements

- **Compute:** Minimum 4x NVIDIA A100 (80GB) or H100 nodes for parallel baseline training.
- **Storage:** 2TB+ SSD for ImageNet dataset, checkpoints, and logs.
- **Software:** PyTorch 2.x, CUDA 12.1+, TensorRT 8.6+.

Risk Management

- **Risk:** Baseline reproduction fails to match reported paper results.
  - *Mitigation:* Use official repos where possible; allow 1-2% margin; document discrepancies.
- **Risk:** H-OBS/R-SPAR fails to meet 3.10x speedup target.
  - *Mitigation:* Aggressively prune later layers; optimize `Block-ELL` kernel earlier (Day 20).
- **Risk:** Training instability (Loss spikes).
  - *Mitigation:* Enable "Stability Score" monitoring early; adjust LR warmup.