Best ARIMA order (v2): (1, 1, 0) CV MAPE: 15.863673794630307

Best GRU v2 cfg: {'units1': 160, 'units2': 96, 'dropout': 0.25, 'window': 28} val_loss: 0.12861500680446625

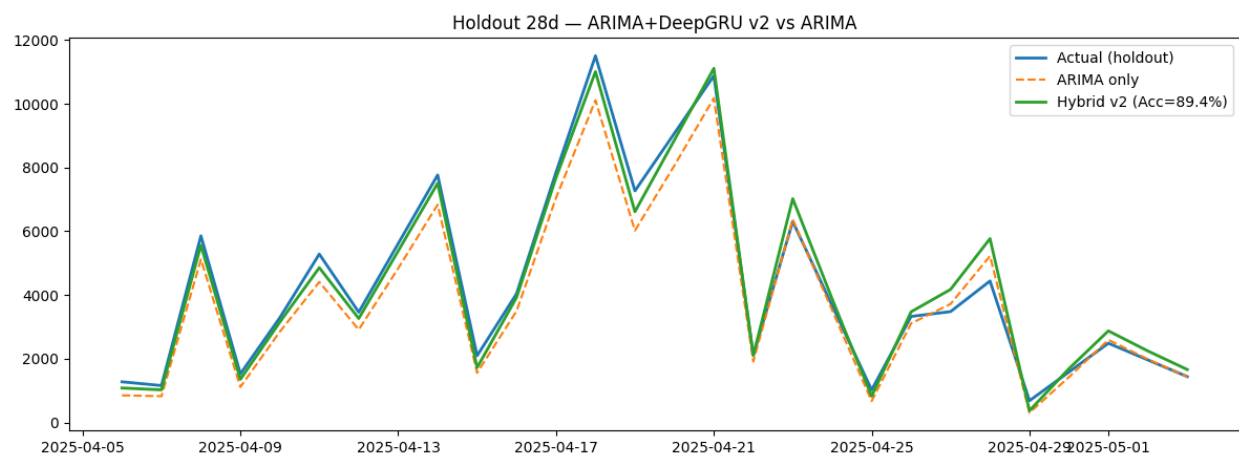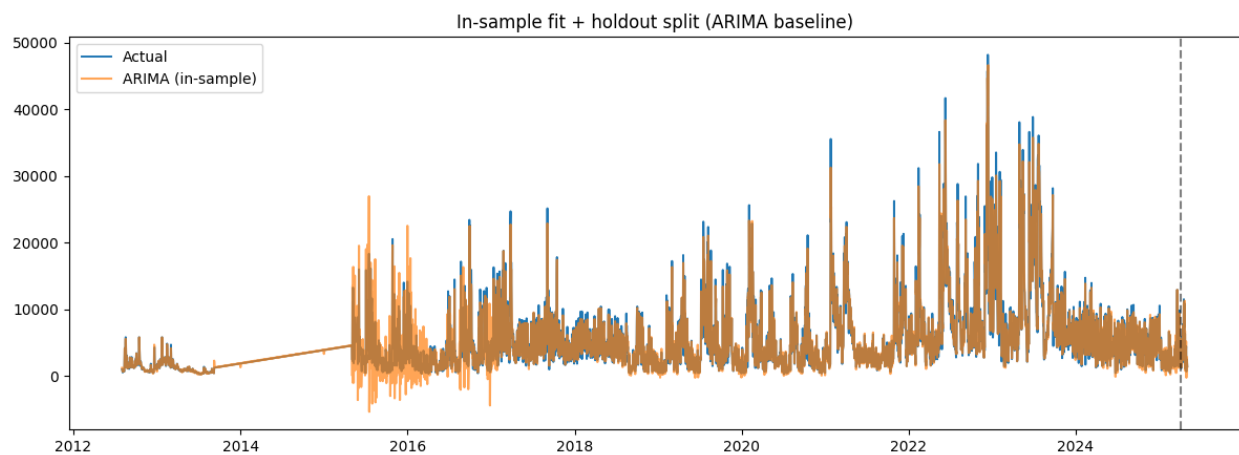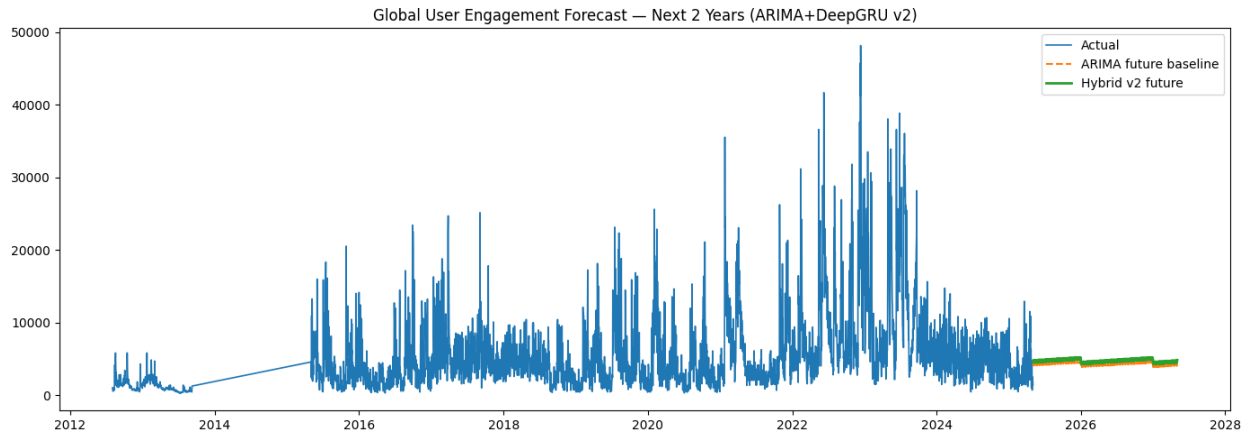=== HOLDOUT (28d) RESULTS — v2 aggressive ===

MAE: 317.89

RMSE: 411.40

MAPE: 10.60%

Accuracy (1-MAPE): 89.40%

ARIMA-only MAPE: 14.98% → ΔMAPE vs Hybrid: +4.38 pts

gamma=1.079, alpha=0.000, beta=112.949

In-sample fit + holdout split (ARIMA baseline)

Holdout 28d — ARIMA+DeepGRU v2 vs ARIMA

Global User Engagement Forecast — Next 2 Years (ARIMA+DeepGRU v2)

Artifacts: /content/hybrid_arima_gru_v2_artifacts

 - 2year_forecast_arima_gru_v2.csv

 - arima_order_v2.json

 - arima_v2_model.pkl

 - gru_v2_residual.keras

 - metrics_arima_gru_v2.json

 - x_scaler_v2.npy

 - y_scaler_v2.npy

Checkpoints: /content/arima_gru_v2_ckpts

 - gru_v2_best_win21.keras

 - gru_v2_best_win28.keras