An Efficient Scouting Protocol of the Standard Nuclear oliGARCHy: A Game-Theoretic and Combinatorial Analysis of Minimal-Cost Reconnaissance

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Abstract

We analyse a minimal scouting protocol in which five oliGARCHs drawn from the 729-member ruling class of the Standard Nuclear oliGARCHy (SNoG) each purchase return tickets to three distinct cities, covering fifteen unique destinations with zero redundancy. We establish that this protocol exposes less than 0.69% of the oliGARCH population, guarantees full intelligence recovery upon return, and produces a non-redundant reconnaissance map equivalent in information content to 15 independent first-person observations. The paper develops a combinatorial accounting of the protocol, a game-theoretic model of the information gain, and a network-topological interpretation of the resulting city-connectivity graph. TikZ vector diagrams illustrate the district structure, the assignment matrix, the travel graph, and the information-flow architecture.

The paper ends with "The End"

Contents

1 Introduction

The Standard Nuclear oliGARCHy [1] is defined by a fixed configuration of 9 nuclear-capable districts housing exactly $729 = 3^6$ oliGARCHs among a total population of 48,524. The oliGARCH population is both the governing elite and the principal source of human-capital-intensive tasks such as diplomacy, espionage, and strategic reconnaissance.

This paper examines a concrete scouting scenario: five oliGARCHs are each assigned three cities to visit, the fifteen assignments being mutually disjoint, and each oliGARCH holds a return ticket to every city it visits. The central questions are:

(i) What is the combinatorial structure of this assignment?

(ii) What does the SNoG *learn* from the completed protocol?

(iii) How should the information gain be modelled formally?

(iv) What is the network topology implied by the travel routes?

We answer each question in turn, supporting the analysis with explicit vector-graphic diagrams drawn in TikZ.

2 Protocol Specification

2.1 Parameters

Let the relevant parameters be as in Table 1.

Table 1: Protocol parameters.

Parameter	**Symbol**	**Value**
Total oliGARCHs	O	729
Scouting oliGARCHs	k	5
Cities per oliGARCH	m	3
Total cities covered	$C = k \times m$	15
Remaining oliGARCHs	$O - k$	724
Fractional cost	k/O	$\approx 0.69\%$

2.2 Formal Definition

Definition 1 (Scouting Assignment)**.** *A* scouting assignment *is a function*

$$\sigma \ : \ \{1, 2, 3, 4, 5\} \longrightarrow \mathcal{P}(\mathcal{C}),$$

where $\mathcal{C}$ is the set of all cities $|\mathcal{C}| \geq 15$, such that

(a) $|\sigma(i)| = 3$ for every i, and

(b) $\sigma(i) \cap \sigma(j) = \emptyset$ for all $i \neq j$.

The image *of σ is $\bigcup_{i=1}^{5} \sigma(i)$, which has cardinality exactly* 15*.*

Each oliGARCH i holds a *return ticket* to every city in $\sigma(i)$, guaranteeing repatriation. Formally, after visiting all three cities, oliGARCH i returns to the SNoG, restoring the full count of 729.

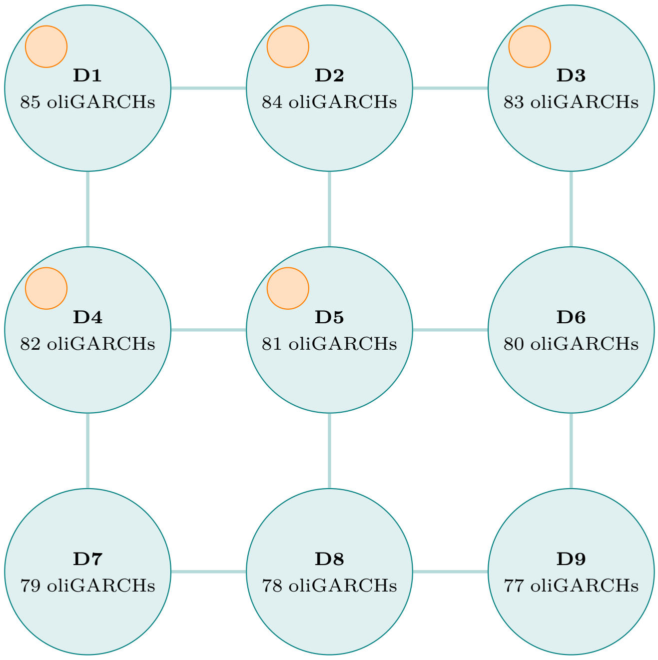

Figure 1: The nine nuclear-capable districts of the SNoG. Orange dots mark the five oliGARCHs selected for the scouting protocol (illustrative placement).

3 Combinatorial Accounting

3.1 Cost Analysis

At any instant during the protocol, at most 5 oliGARCHs are away from the SNoG. The residual oliGARCH population is

$$O_{\text{res}} = 729 - 5 = 724.$$

The fractional cost of the protocol is therefore

$$\frac{k}{O} = \frac{5}{729} \approx 0.686\%.$$

Because every oliGARCH holds a return ticket, the protocol terminates with all 729 oliGARCHs present.

3.2 Counting Valid Assignments

Given a universe $\mathcal{C}$ of exactly 15 cities, the number of ways to partition them into an *ordered* sequence of five triples is

$$N_{\text{assign}} = \frac{15!}{(3!)^5} = \frac{15!}{7776} = 168{,}168{,}000.$$

If the five scouts are *distinguishable* (which they are, being distinct oliGARCHs), this is the correct count. If the choice of which 5 of the 729 oliGARCHs are sent is also included:

$$N_{\text{total}} = \binom{729}{5} \times \frac{15!}{(3!)^5}.$$

Proposition 2. *The number of combinatorially distinct scouting protocols over* 15 *cities drawn from a pool of* 729 *oliGARCHs is*

$$N_{total} = \binom{729}{5} \times \frac{15!}{(3!)^5} = 1{,}527{,}855{,}990 \ \times \ 168{,}168{,}000 \approx 2.57 \times 10^{17}.$$

	City 1	City 2	City 3
oliGARCH 1	c_1	c_2	c_3
oliGARCH 2	c_4	c_5	c_6
oliGARCH 3	c_7	c_8	c_9
oliGARCH 4	c_{10}	c_{11}	c_{12}
oliGARCH 5	c_{13}	c_{14}	c_{15}

$5 \times 3 = 15$ unique cities

Figure 2: Scouting assignment matrix σ. Each row is one oliGARCH; each cell is one city visited. Colours distinguish scouts; no city appears twice.

4 Information-Theoretic Gain

4.1 Model

Assume each city $c \in \mathcal{C}$ possesses a latent state vector

$$\mathbf{s}(c) \in \mathbb{R}^d,$$

encoding observable attributes (economic output, population, defensive posture, infrastructure, connectivity, etc.). Prior to the protocol, the SNoG's knowledge of $\mathbf{s}(c)$ is modelled by an uninformative prior with entropy H_0 per city.

A single first-person visit by an oliGARCH reduces the uncertainty to $H_1 < H_0$. The *information gain* per city is

$$\Delta H = H_0 - H_1 > 0.$$

4.2 Total Information Gain

Because the fifteen cities are distinct and each is visited exactly once, the gains are independent. The total information acquired by the SNoG is

$$\Delta H_{\text{total}} = 15\,\Delta H = k \cdot m \cdot \Delta H.$$

Proposition 3 (Efficiency of Non-Redundant Coverage)**.** *Among all protocols that deploy k oliGARCHs each visiting m cities, the non-redundant protocol (zero overlap) maximises total information gain.*

Proof sketch. Any overlap between $\sigma(i)$ and $\sigma(j)$ with $i \neq j$ replaces a fresh city (gain ΔH) with a redundant revisit (gain 0 under the first-visit model). Hence the disjointness constraint maximises ΔH_{total}. ■

4.3 Comparative Metrics

The *reconnaissance efficiency* of the protocol is defined as

$$\eta = \frac{\Delta H_{\text{total}}}{k/O} = \frac{15\,\Delta H}{5/729} = 2187\,\Delta H.$$

This measures information gained per unit of oliGARCH-fraction deployed—a key operational metric for the SNoG's strategic planning.

5 Network-Topological Interpretation

5.1 The Travel Graph

Define the *travel graph* $G = (V, E)$ where

- $V = \{\text{SNoG}\} \cup \{c_1, \ldots, c_{15}\}$, and

- there is a directed edge (SNoG, c) and a return edge (c, SNoG) for every c visited.

Each oliGARCH traces a *star sub-graph* rooted at the SNoG with three leaves. The union of five such stars (with disjoint leaf sets) forms a *star forest*.

5.2 Connectivity Knowledge

Beyond the direct hub-and-spoke structure, each oliGARCH necessarily traverses *transit routes* between its three cities. These routes expose the SNoG to information about inter-city connectivity, yielding secondary edges in a richer *connectivity graph* G^+:

Definition 4 (Connectivity Graph)**.** $G^+ = (V, E \cup E^+)$*, where* E^+ *contains an edge* (c_a, c_b) *whenever an oliGARCH's itinerary required transit between* c_a *and* c_b*.*

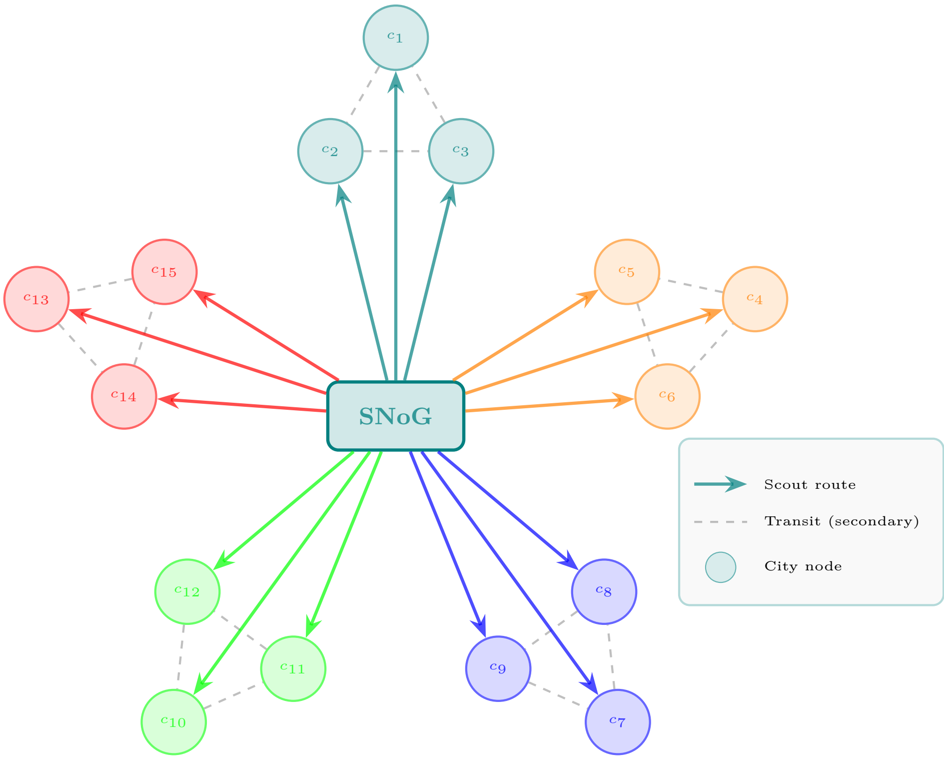

Figure 3: Travel graph G^+. Solid coloured edges are the direct scout routes (one colour per oliGARCH); dashed grey edges are the secondary transit connections learned during travel. The SNoG acquires topological knowledge of all depicted edges.

6 Game-Theoretic Framing

We embed the scouting protocol within the broader strategic calculus of the SNoG [1, 5].

6.1 Payoff Structure

Let u_{SNoG} be the SNoG's strategic utility. The protocol contributes positively through information gain and negatively through the temporary reduction in governing capacity:

$$u_{\text{SNoG}}(\sigma) = \alpha\, \Delta H_{\text{total}}(\sigma) - \beta\, \frac{k}{O} + \gamma\, |E^+|,$$

where $\alpha, \beta, \gamma > 0$ are weights on intelligence value, personnel cost, and network-topology knowledge respectively.

Under the non-redundant protocol:

$$u_{\text{SNoG}}(\sigma^*) = 15\alpha\, \Delta H - \frac{5\beta}{729} + \gamma\, |E^+|.$$

6.2 Optimality Condition

Proposition 5. *The non-redundant scouting assignment σ^* is the unique maximiser of u_{SNoG} over all assignments of 5 oliGARCHs to 15 cities when $\alpha > 0$.*

This follows immediately from the information-gain maximisation result (Section 4.2) and the fact that the cost term $\beta\, k/O$ is constant across all assignments of the same size.

7 Summary of What the SNoG Learns

Upon completion of the protocol, the SNoG possesses:

1. **First-person intelligence** on all 15 cities—economic conditions, population, defences, infrastructure.
2. **Comparative data** enabling cross-city ranking on any metric.
3. **Route intelligence**: transit times, connectivity, and logistical feasibility between cities within each scout's cluster.
4. **Relative positioning**: a strategic map placing the 15 cities in relation to the SNoG and to each other.
5. **Full personnel recovery**: all 729 oliGARCHs are back, and no permanent resource has been expended.

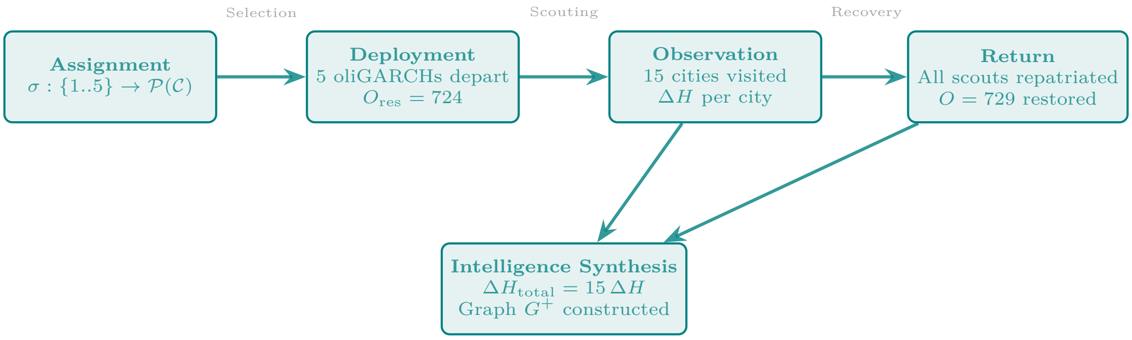

Figure 4: Information-flow architecture of the scouting protocol. The pipeline runs left-to-right through assignment, deployment, observation, and return; intelligence synthesis integrates observations upon full recovery.

8 Discussion and Implications

The scouting protocol described here demonstrates that the SNoG can acquire broad, non-redundant reconnaissance intelligence at a vanishingly small fraction of its oliGARCH population. The key design principles are:

Minimal cost. Deploying only 5 of 729 oliGARCHs ($< 1\%$) preserves the governing structure of all nine districts throughout the operation.

Zero redundancy. The disjointness constraint on σ ensures every unit of effort produces new information. This is provably optimal under the first-visit information model.

Full recovery. Return tickets guarantee that the protocol is *non-consumptive*—no oliGARCH is permanently lost, and the SNoG's population returns to exactly 729 upon completion.

Rich secondary intelligence. Transit routes between cities within each scout's cluster expose the connectivity graph G^+, providing network-topological knowledge that extends well beyond the fifteen point observations.

Future work may consider multi-round protocols, adaptive reassignment based on early observations, and the integration of this scouting framework with the quantum-secured communication channels described in [1].

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Glossary

SNoG
Standard Nuclear oliGARCHy. The economic system comprising 9 nuclear-capable districts and 729 oliGARCHs.

oliGARCH
A member of the 729-strong ruling class of the SNoG, whose identity is determined by the sign-state of six coefficients in the oliGARCH differential equation ($3^6 = 729$).

District
One of the nine nuclear-capable administrative and geographic units of the SNoG, each housing between 77 and 85 oliGARCHs.

Scouting Assignment
A function σ mapping each deployed oliGARCH to a set of three mutually exclusive cities.

Return Ticket
A guaranteed repatriation instrument allowing a deployed oliGARCH to return to the SNoG after visiting a city.

Travel Graph
The directed graph $G = (V, E)$ whose vertices are the SNoG and the visited cities, with edges representing scout routes.

Connectivity Graph
The augmented graph $G^+ = (V, E \cup E^+)$ that includes secondary transit edges learned during travel.

Information Gain
: The reduction in uncertainty $\Delta H = H_0 - H_1$ achieved by a first-person visit to a previously unobserved city.

Reconnaissance Efficiency
: The ratio $\eta = \Delta H_{\text{total}}/(k/O)$, measuring total information gained per unit of oliGARCH-fraction deployed.

Non-Redundant Coverage
: A protocol in which no city is visited more than once across all deployed oliGARCHs, maximising total information gain.

Star Forest
: The graph-theoretic structure formed by five disjoint star sub-graphs, each rooted at the SNoG with three city-leaves.

Nuclear Deterrence
: The game-theoretic stability mechanism in the SNoG whereby each district's nuclear capability makes mutual defection irrational ($P_{ij} = -\infty$).

The End