Use Case 1: Configure Simulation Settings

Description: The Simulation Administrator defines the parameters for radar stations and consumer clients in order to customize the simulation.

Actors:

1. Simulation Administrator

Preconditions:

1. The System is accessible and ready to accept configuration settings.

Flow:

1. The Simulation Administrator accesses the simulation settings interface.
2. The System presents an interface/catalog allowing the Simulation Administrator to select the type and the desired number of radar stations and consumer clients.
3. The Simulation Administrator selects the desired number of radar stations as well as the number of consumer clients from the presented catalog.
4. The Simulation Administrator sets the period of simulation.
5. The Simulation Administrator submits the configuration.
6. The System validates the inputs and updates the simulation settings accordingly.
7. The System will save the configuration settings.

Postconditions:

1. The simulation settings will be added to the configuration catalog.

Use Case 2: Define Radar Station

Description: The System creates a new type of a radar by parameters provided by the user to be added to the radar catalog.

Actors:

1. Simulation Administrator

Preconditions:

1. The radar generation parameters have been properly defined.

Flow:

1. The System presents an interface prompting desired parameters allowing the Simulation Administrator to define a new radar type.
2. The Simulation Administrator passes in the parameters (required unique_id and data transmission interval) for the radar station.
3. The System saves and adds the radar station to the radar catalog.

Postconditions:

1. A new type of radar station is created and saved and will be ready to be used in a simulation.

Use Case 3: Define Consumer Client

Description: The System creates a new type of client by parameters provided by the user to be added to the client catalog.

Actors:

1. Simulation Administrator

Preconditions:

1. The client parameters have been decided.

Flow:

1. The System presents an interface prompting desired parameters allowing the Simulation Administrator to define a new consumer client.
2. The Simulation Administrator passes in the required parameters.
3. The System saves the client to the consumer client catalog.

Postconditions:

1. A new type of consumer client is created and saved and will be ready to be used in a simulation.

Use Case 4: Generate Reports

Description: The System compares and contrasts the data transmitted by the radar station and the data received by the consumer client. Then it checks whether the data is transmitted successfully.

Actors:

1. Simulation Administrator

Preconditions:

1. Radar stations have been instantiated and actively transmitting data and the consumer clients have been instantiated and actively receiving data.
2. The simulation has run for a specified period or reached a designated stopping condition.

Flow:

1. The Simulation Administrator starts the report generation process.
2. The System retrieves the data dispatched by the radar station and received by consumer client instances.
3. The System compares and contrasts the data, ensuring its accuracy, consistency, and completeness.
4. The System generates comprehensive reports summarizing the benchmarking results.
5. The System presents the generated reports to the Simulation Administrator for review and analysis.

Postconditions:

1. Report summarizing the benchmarking results is generated for the lifespan duration of the radars and clients.

Use Case 5: Run Simulation

Description: The System loads a pre-defined simulation configuration, instantiates radar stations and consumer clients based on the loaded configuration, and enables the transmission of data from the radar stations to the S6 node and from the S6 node to the clients.

Actors:

1. Simulation Administrator

Preconditions:

1. The simulation configuration exists with predefined settings for radar stations and consumer clients.
2. S6 node is accessible and its API interface is available.

Flow:

1. The System displays the simulation configuration
2. The Simulation Administrator selects the configuration from the configuration catalog
3. The System retrieves the simulation configuration.
4. The System instantiates radar stations based on the defined parameters in the configuration.
5. The System instantiates consumer clients based on the defined parameters in the configuration catalog.
6. The System establishes the necessary connections between the radar stations and the S6 node.
7. The System facilitates the transmission of data from the radar stations to the S6 node.
8. The System establishes the necessary connections between the S6 node and consumer client.
9. The consumer client starts receiving the processed data from s6 node.
10. The System monitors and logs the data transmission process for analysis and verification from both the radar and the consumer client.

Postconditions:

1. The simulation configuration is successfully loaded and validated.
2. The simulation records generated by the radar station(s) have been recorded.
3. The simulation records are ready for benchmarking and performance evaluation.