

Real World Dynamic Sky System - Day/Night Cycle (Sun, Moon & Stars)

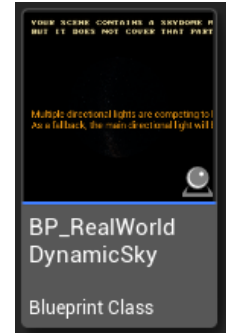
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1. Implementation (Getting Started)

1. **Clean your Level:** Before adding the blueprint, delete any existing **Directional Lights**, **Sky Light**, **Sky Atmosphere**, **Volumetric Clouds**, **Post Process Volumes** or **Sky Spheres** from your level to avoid conflicts.
2. **Add the Actor:** Drag and drop the **BP_RealWorldDynamicSky** into your level.
 - a. **Recommendation:** Set the Location to **0, 0, 0** and Rotation to **0, 0, 0**.
3. **Done!** The system will immediately start calculating the sun and moon position based on the default settings.



2. Important Notes & Component Settings

Exposure Settings: The included Post Process Volume has exposure settings specifically tuned for the day/night cycle. If you disable the internal Post Process Volume (**UsePostProcessVolume = False**) to use your own, ensure you adjust your Exposure Min/Max Brightness, otherwise, the night might look too bright or the day too dark.

Moon Visibility & Clouds:

- **Standard Setup:** The Moon Material (**M_Moon_Master**) has **"Apply Cloud Fogging"** enabled by default. This ensures the moon is realistically obscured when behind Volumetric Clouds.
- **Without Clouds:** If you disable **UseVolumetricClouds** in the Blueprint, you **must** also disable **"Apply Cloud Fogging"** in the **M_Moon_Master** Material Instance. Otherwise, the moon will appear dark or invisible because the shader expects cloud data that isn't there.
- **Large Moon Scale:** If you use a very large moon size, you can enable **"Compute Fog Per Pixel"** in the Moon Material for better visual quality (Note: This has a small performance cost).

Light Intensity: To change the brightness of the Sun or Moon, select the specific component (Directional Light) within the Blueprint hierarchy and adjust the **Intensity (Lux)** directly. The Blueprint does not override these values during runtime.

3. Blueprint Parameters (Details Panel)

Select the **BP_RealWorldDynamicSky** in your level to access these settings in the **Details Panel**.

Category: Mode

- **Simulation Mode:**

- **UTC System Time:** Uses your computer's real-world system time.
- **Fixed Custom Time:** Uses the specific static Date/Time set in the *Custom Date Time* category.
- **Simulate Custom Time:** Starts at the set Date/Time and simulates the passage of time when you press Play.
- **Use Save Game:** (Only for *Simulate Custom Time*). If True, the system attempts to load the last saved time at **BeginPlay**. If no save exists, a new one is created.
- **Delete Save Game:** (Boolean). Click this to delete the current save file and reset the simulation.
- **Simulation Speed:** Multiplier for time passage (e.g., 1.0 = Real Time, 60.0 = 1 minute per second). Only works in *Simulate Custom Time* mode.
- **Update Interval in Seconds:** Determines how often the sun/moon positions are recalculated. Lower values are smoother but cost more performance.
- **Save Interval in Seconds:** How often the current simulation time is written to the save file.
- **Create Debug Widget:** If True, adds a UI overlay showing a world map, current time, sunrise/sunset, moon phase ("Waxing Gibbous", etc.), and location data.
 - *Note:* The "Recommended Timezone" on the widget is a simple calculation based on Longitude and does not account for borders.



Category: Location

- **City Presets:** Choose from 11 presets (London, New York, Tokyo, etc.) to automatically set Latitude/Longitude. Select **Custom** to enter your own coordinates.
- **Latitude / Longitude:** (If Custom is selected) Manually set the geographic coordinates.
- **North Offset:** Rotates the entire sky system (0-360 degrees). Use the **North Indicator Mesh** (arrow) on the Blueprint to align the sky with your level's North.
- **Use Calculated Timezone:** If True, the system estimates the timezone based on Longitude.

- **Timezone:** (If *Use Calculated Timezone* is False). Manually set the offset from UTC (e.g., +1 for CET) to ensure the displayed time matches the sun position correctly.

Category: Custom Date Time

- **Year, Month, Day, Hour, Minute, Second:** Sets the start time for *Fixed* or *Simulate Custom Time* modes. Note: Enter time in **UTC+0**.

Category: Moon

- **Use Moon Real Size:** (Default: False). Unreal's Field of View makes the real moon size appear very small. Keep this False for a visually pleasing, cinematic moon.
- **Simulate Supermoons:** If True, calculates the moon's actual distance (Perigee/Apogee) to create slight realistic variations in size over time.
- **Custom Moon Size:** Scales the moon mesh (only active if *Use Moon Real Size* is False).
- **Moon Distance:** Sets the distance of the moon mesh from the center. If *Use Moon Real Size* is True, this scales dynamically to maintain visual accuracy.
- **Moon Emissive Intensity:** Controls the brightness of the lit portion of the moon.

Category: Sky Sphere

- **Stars Brightness:** Controls the intensity of the star map and Milky Way.
- **Sky Base Glow:** Adds a base brightness to the night sky to prevent it from being pitch black (simulating light pollution or atmosphere).
- **Sky Base Glow Color:** The color tint for the base glow.

Category: Texture Quality

- **Moon Texture Quality:** Selects the resolution of the moon texture.
 - 0: 2K
 - 1: 4K
 - 2: 8K
 - 3: 16K
- **Sky Texture Quality:** Selects the resolution of the star map/sky.
 - 0: 4K
 - 1: 8K
 - 2: 16K

Category: Fog

- **Fog Density:** Directly controls the *Exponential Height Fog* component density.
- **Fog Height Falloff:** Directly controls the height falloff.

Category: Component Rendering

Use these Booleans to disable built-in components if you prefer to use your own (e.g., custom clouds).

- **UsePostProcessVolume**
 - **UseVolumetricClouds**
 - **UseExponentialHeightFog**
 - **UseSkyAtmosphere**
-

4. Blueprint Integration

To access time or location data in your own scripts (e.g., for a custom HUD or gameplay logic):

1. Use the node **Get Actor of Class** -> Select **BP_RealWorldDynamicSky**.
2. Save the return value as a variable.
3. You can now access public variables such as:
 - **CurrentDateTimeUTC**
 - **Timezone** (Float)

5. Support

If you have any questions, please send an email to support@geamgames.com

6. Credits & Attributions

Moon Textures: NASA's Scientific Visualization Studio

Sky Textures: NASA/Goddard Space Flight Center Scientific Visualization Studio