

Climate Intervention Organizations by Intervention Type Deep Research

To identify promising early partners for **Bloom Command** (a climate deployment coordination system), we have compiled key organizations across intervention categories. Each entry includes the organization's name, type (startup, corporation, NGO, government, or academic), their **intervention method(s)**, primary regions of operation, and why they would benefit from real-time deployment coordination. We have organized the list by intervention type for clarity.

Direct Air Capture (DAC)

- **Climeworks** – *For-profit startup (Switzerland)* – **Method:** Direct air capture using modular solid sorbent units. **Region:** Europe (Swiss HQ; Orca & Mammoth DAC plants in Iceland). **Fit:** Climeworks built the world's first commercial DAC plant (Orca, ~4,000 tCO₂/year) and is scaling up to a larger "Mammoth" facility decarbonfuse.com. They must optimize site selection (e.g. co-locating with renewable energy and CO₂ storage in basalt) and timing of operations. A coordination platform could help maximize CO₂ removal when renewable energy is abundant and streamline multi-module operations decarbonfuse.com.
- **Carbon Engineering / 1PointFive** – *Startup (Canada) now partnered with Occidental Petroleum (US)* – **Method:** Liquid-solvent DAC with geological storage or synthetic fuel conversion. **Region:** North America (tech developed in Canada; first mega-plant under construction in Texas). **Fit:** Backed by Occidental's subsidiary **1PointFive**, Carbon Engineering is building a *megaton-scale* DAC facility aiming to capture 1 million tons of CO₂ per year decarbonfuse.com. This *large infrastructure project* involves integrating DAC with pipelines and storage, making real-time optimization crucial (e.g. adjusting operations to grid energy, weather, and maintenance schedules). A coordination system would help manage such a complex deployment and maximize uptime and efficiency decarbonfuse.com.
- **Global Thermostat** – *For-profit startup (USA)* – **Method:** DAC using amine sorbents on modular stacks, powered by low-cost heat sources decarbonfuse.com. **Region:** USA (pilot facilities). **Fit:** Global Thermostat's compact, modular units can be sited at industrial facilities or power plants to utilize waste heat decarbonfuse.com. As they roll out multiple units, a central coordination system could optimize placement (e.g. near suitable heat sources) and timing (running when heat is available) across sites. This would improve CO₂ capture efficiency and help companies integrate DAC into existing operations smoothly.
- **Heirloom Carbon** – *For-profit startup (USA)* – **Method:** DAC via accelerated **mineralization** – minerals naturally absorb CO₂, then are heated to release pure CO₂ for storage, and the cycle repeats decarbonfuse.com. **Region:** USA (R&D in California) with pilot partnerships in Iceland. **Fit:** Heirloom's approach uses common minerals to passively soak up CO₂, dramatically lowering energy use decarbonfuse.com. They won an XPRIZE Milestone award and partnered with Iceland's Carbfix for CO₂ storage cleantechnica.com. As they scale, Bloom Command could help **coordinate site selection** (e.g. areas with suitable mineral supply and weather for optimal absorption) and **timing** (cycling the mineral exposure and regeneration processes for maximum capture). Real-time data (on ambient CO₂, humidity, etc.) would let them schedule mineral "recharge" periods to boost efficiency cleantechnica.com.
- **CarbonCapture Inc.** – *For-profit startup (USA)* – **Method:** Mass-manufactured modular DAC "boxes" using solid sorbents frontierclimate.com. **Region:** USA (planning large deployments in Wyoming's carbon storage hub). **Fit:** CarbonCapture's "**Project Bison**" aims to deploy thousands of small DAC modules in a network. A coordination system could be vital to **optimize the operation of distributed DAC units**, turning modules on/off in response to energy supply or weather, and directing captured CO₂ to storage. By networking the modules, Bloom Command could help them scale up efficiently while minimizing costs and downtime.
- **Mission Zero Technologies** – *For-profit startup (UK)* – **Method:** Low-cost, solvent-based DAC with an energy-efficient design decarbonfuse.com. **Region:** United Kingdom. **Fit:** Mission Zero is developing a **pilot DAC plant in the UK** (supported by UK government innovation grants) focusing on modular, heat-integrated designs. Their system is meant to be *cheaper and less energy-intensive* than conventional DAC decarbonfuse.com. As they move from lab to field pilot, real-time optimization of heat integration and absorber cycles will be crucial. Bloom Command could assist in **siting pilots** (e.g. co-located with industrial waste heat or a small reactor) and in **operational decisions** (when to run adsorption/desorption cycles) to prove efficiency at scale.
- **Carbyon** – *For-profit startup (Netherlands)* – **Method:** Novel DAC using fast-rotating sorbent contactors. **Region:** Europe. **Fit:** Carbyon, an XPRIZE Milestone winner cleantechnica.com, is developing an efficient DAC device aiming to minimize pressure

drop and energy use. As a European startup intending to deploy DAC units across locations, they would benefit from a coordination platform for **deployment planning** (identifying optimal climates and energy sources in EU for their units) and for linking with CO₂ storage or utilization sites.

- **Octavia Carbon** – *For-profit startup (Kenya)* – **Method:** Direct air capture (design inspired by proven liquid and solid DAC techniques). **Region:** Africa (Kenya). **Fit:** Octavia Carbon is Africa's first DAC company, planning a pilot DAC plant in Kenya's Rift Valley by 2024–2025. They aim to leverage Kenya's renewable geothermal and solar energy for DAC. A system like Bloom Command would help **coordinate operations in sync with energy availability** (e.g. run DAC hard when surplus geothermal power is available) and **guide site selection** in East Africa's unique climate. As a first mover in developing nations, Octavia could also use the system to integrate regional climate data and model CO₂ uptake under local conditions – de-risking their deployments.
- **U.S. DOE DAC Hubs** – *Public-private initiatives (USA)* – **Method:** Large-scale DAC with geologic storage. **Region:** United States (multiple hubs). **Fit:** The U.S. Department of Energy is funding several **DAC Hub projects** (e.g. *Project Cypres* in Texas led by Oxy/Carbon Engineering, and another hub with Climeworks in the Southwest) to capture millions of tons of CO₂decarbonfuse.com. These involve coordinating many stakeholders, from technology providers to storage operators. A real-time coordination system could help **optimize hub operations** – balancing capture rates, energy loads, and injection schedules – and provide a centralized dashboard for hub operators and funders to monitor performance. Given these hubs are essentially *first-of-a-kind carbon infrastructure*, Bloom Command could ensure they run smoothly and deliver promised climate outcomes.
- **Sizewell C DAC Project** – *Consortium (UK)* – **Method:** Heat-powered DAC integrated with a nuclear plant. **Region:** United Kingdom (Sizewell). **Fit:** A consortium led by the planned Sizewell C nuclear power station is designing a **direct air capture system that uses reactor heat** instead of electricitygov.uk. The concept could capture ~1.5 million tonnes of CO₂ per year by utilizing up to 400 MW of waste heat from the plantgov.uk. This novel approach will require precise **coordination between the power plant and DAC operation** – adjusting CO₂ capture rates based on reactor output and maintenance. Bloom Command could serve as the control layer that schedules DAC operations to match heat availability and optimizes CO₂ capture without affecting the power plant's primary function. It would also aid in **site integration** (ensuring DAC units are placed optimally on the site for heat transfer and airflow).

*(Additional DAC players: Other notable DAC-focused startups include **Verdax** (USA, electrochemical DAC using electroswing adsorption)decarbonfuse.com, **AirCapture** (USA, modular units for on-site CO₂ supply)decarbonfuse.com, and **Skytree** (Netherlands, small-scale DAC for enclosed environments). These companies are earlier-stage but could be future beneficiaries of deployment optimization as they move from prototype to field deployment.)*

Biochar & Biomass Carbon Removal

Biochar projects remove carbon by turning biomass into stable charcoal, often improving soils in the process. Many are **distributed operations** (collecting agricultural/forestry residues and running pyrolysis units), which stand to gain from coordinated scheduling and site selection. Below are key biochar startups, larger operators, and programs:

- **Pacific Biochar** – *For-profit startup (USA)* – **Method:** Converts waste biomass into biochar at scale. **Region:** Western USA (California). **Fit:** Pacific Biochar retrofits idle biomass power plants into biochar production sitestrellis.net. They gather forest residues from fire-prone areas (reducing wildfire risk) and produce biochar for farms and composterstrellis.net. They're delivering 1,500 tCO₂ worth of biochar credits to Microsofttrellis.net. A coordination system could help **optimize feedstock logistics and site scheduling** – e.g. timing biomass collection from forests, maximizing char yields, and allocating biochar shipments to buyers. As they scale to multiple facilities, real-time ops management will ensure consistent quality and carbon accounting.
- **Rainbow Bee Eater** – *For-profit company (Australia)* – **Method:** Integrated biochar and energy via pyrolysis (the “ECHO2” system). **Region:** Australia (pilot plant near Melbourne). **Fit:** Rainbow Bee Eater's technology produces **renewable energy (syngas) and biochar** from waste biomass like crop residues, grass clippings, and wood wastetrellis.net. They create circular flows – using low-value organics to make energy and biochar, which is then sold as fertilizer and feed additivetrellis.net. They have sold biochar credits to Shopify and Microsoft and run a pilot facility in Victoriatrellis.net. With a coordination platform, they could **decide when to prioritize energy vs. char output** based on grid needs or carbon prices, and **select new deployment sites** (e.g. farming regions with abundant residues) by analyzing biomass supply and demand for co-products.

- **Carbofex** – *For-profit startup (Finland)* – **Method:** Industrial-scale biochar production with co-product bio-oil. **Region:** Finland (pilot plant in Tampere). **Fit:** Carbofex has operated a demo plant since 2017, now producing ~700 tons of biochar and 600 tons of bio-oil per year trellis.net. They have sequestered ~9,800 tCO₂ since 2017 and sold credits to Shopify and Microsoft trellis.net. As an early mover in Europe, Carbofex is looking to scale up. Bloom Command could help them **optimize throughput vs. residence time** in reactors to maximize stable carbon, schedule maintenance to minimize downtime, and coordinate **feedstock sourcing across seasons** (ensuring steady input of wood chips). It can also inform **where to site new units** in Europe by analyzing forestry waste availability and local heat/power offtake opportunities.
- **Carbo Culture** – *For-profit startup (USA/Finland)* – **Method:** “Carbolysis” – a proprietary high-pressure pyrolysis to produce biochar. **Region:** USA and Europe (labs in Finland). **Fit:** Carbo Culture raised \$6.2 M in 2021 to scale its patented process trellis.net. They aim for **1 billion tons CO₂ removed per year** eventually, and have pre-sold removals to buyers like South Pole trellis.net. Their approach likely involves deploying multiple modular reactors. A coordination system would assist in **ramp-up scheduling** – when to bring new reactors online, how to distribute production to meet removal delivery timelines – and in **site selection** (targeting regions with policy support or abundant feedstock). As they promise large volumes to corporate buyers, real-time tracking and optimization will be key to meet delivery targets cost-effectively.
- **Carbon Cycle** – *For-profit company (Germany)* – **Method:** Produces high-quality biochar from woodchips; sells both biochar and carbon credits. **Region:** Germany (serving EU farming markets). **Fit:** Carbon Cycle straddles traditional and new markets – selling biochar to farmers for soil improvement, while also listing carbon removal credits on Puro.earth trellis.net. They have delivered 400 tCO₂ in credits to Microsoft trellis.net. To scale up, they will be working with many farms and possibly decentralized production sites. Bloom Command could help **coordinate deployment of pyrolysis units on farms or at mills**, timing production runs with seasonal availability of woodchips. It could also integrate their carbon monitoring – ensuring that credits sold (via MRV systems) align with actual production in near-real-time, building buyer confidence.
- **Ecoera** – *For-profit company (Sweden)* – **Method:** Large-scale biochar via pyrolysis of agricultural residues; also produces syngas for heating. **Region:** Sweden. **Fit:** Ecoera has operated since 2009, being Sweden’s first big biochar producer trellis.net. They participate in a “Carbon Valley” pilot, aiming for climate-positive agriculture trellis.net. Shopify has funded them to remove bottlenecks in biochar supply trellis.net. As they integrate into farming systems (providing heat and soil amendments), coordination software could optimize **which residues to char vs. leave for soil**, manage **energy output vs. char output** depending on local heating needs, and coordinate multi-site operations (they may have units on different farms or a central facility collecting from many farms). Real-time analytics can help demonstrate carbon removal efficiency to their investors and buyers.
- **The Bioeconomy Institute (Iowa State University)** – *Academic research team (USA)* – **Method:** Innovative small-scale pyrolyzers for carbon removal. **Region:** USA (Iowa). **Fit:** This *non-profit/academic* team developed a lab-scale pyrolysis unit that produces biochar and bio-oil, and won a \$1 M XPRIZE Milestone trellis.net. They also run a larger pilot at the BioCentury Research Farm in Iowa trellis.net. As a research consortium now translating to field demonstrations, a system like Bloom Command would help them **coordinate experiments and field trials** – e.g. scheduling runs of their pilot plant to test different feedstocks under varying conditions. It can also facilitate data-sharing across research sites and eventually help plan **scale-up pathways** (identifying ideal locations in the Midwest with lots of ag waste for a first commercial plant). Essentially, it can turn their experimental knowledge into operational guidelines for future biochar deployments.
- **Charm Industrial** – *For-profit startup (USA)* – **Method:** Pyrolysis of biomass into **bio-oil**, which is injected underground for carbon storage (a bio-oil sequestration approach, related to biochar). **Region:** USA. **Fit:** While Charm’s primary output is bio-oil rather than solid char, they address the same space of biomass carbon removal. They have contracts to remove CO₂ for companies like Microsoft by converting crop residues into a stable oil and sinking it in geologic formations decarbonfuse.com. Charm’s operations involve **coordinating feedstock harvesting, mobile pyrolysis units, and transport for injection**. A real-time coordination tool could help schedule these logistics – aligning harvest, processing, and injection windows – and dynamically choose which fields or oil wells to target. For early outreach, Charm provides a perspective on **managing a carbon removal supply chain end-to-end**, which is invaluable for Bloom Command’s development.

(Additional biochar initiatives: There are many emerging biochar efforts globally. For example, **Mersey Biochar (UK)** is demonstrating community-scale biochar for local energy and carbon credits gov.uk. **Takachar** (Kenya/Canada) builds small-scale, low-cost char units for rural communities and won an XPRIZE Milestone cleantechnica.com. NGOs like **Black Earth** and networks like the **International Biochar Initiative** work on standards and projects worldwide. Any program dealing with

distributed biomass resources and carbon accounting would be a strong candidate for Bloom Command's coordination and optimization capabilities.)

Ocean Alkalinity Enhancement & Ocean-Based CDR

Several startups and projects are pursuing **ocean-based carbon dioxide removal**, either by **adding alkalinity to seawater** (to enhance CO₂ uptake) or by growing and sequestering biomass in the oceans. These efforts often involve complex environmental monitoring, **site selection in vast ocean areas, and timing deployments with ocean conditions** – exactly the challenges a real-time coordination system can address. Key players include:

- **Planetary Technologies** – *For-profit startup (Canada)* – **Method:** Ocean alkalinity enhancement (OAE) via adding alkaline minerals to coastal waters; co-produces hydrogen and other materials. **Region:** Canada (pilot in Nova Scotia), planning UK projects. **Fit:** Planetary (an XPRIZE Milestone winner) introduces alkaline substances into seawater outflows (e.g. from wastewater plants or power plants) to raise ocean pH and capture CO₂planetarytech.comfrontierclimate.com. In 2023–24, they ran a pilot in Halifax, Canada, showing measurable CO₂ drawdown and pH increase from their dosingplanetarytech.com. They also just delivered the **world's first ocean alkalinity carbon credits** to buyerscarbonherald.comfrontierclimate.com. As they scale up, Planetary will need to **identify optimal coastal sites** (considering water flow, baseline chemistry, and ecology) and decide **when and how much alkalinity to add** for maximum carbon removal without harming ecosystems. A system like Bloom Command can integrate oceanographic data, model dispersion, and help coordinate dosing schedules. It would effectively serve as the “command center” for multi-site OAE deployments (managing sensor inputs, dosing units, and verification data in real time).
- **Ebb Carbon** – *For-profit startup (USA)* – **Method:** Electrochemical ocean alkalinity enhancement – using electricity to create a **basic solution** added to seawater, which increases CO₂ absorption and counteracts ocean acidityenergy.govenergy.gov. **Region:** USA (Pacific Northwest pilot with NOAA/PNNL). **Fit:** Ebb Carbon's system, developed with NOAA and Pacific Northwest National Lab, was *deployed in Sequim Bay (Washington) in late 2023* – the **first-of-its-kind marine CDR demo** capable of ~100 tCO₂/year captureenergy.govenergy.gov. It pumps seawater through electrochemical cells, splitting it into acidic and basic streams; the basic water (rich in alkalinity) is then added back to the ocean to draw down CO₂energy.gov. This project already involves *multiple partners and careful monitoring* (they initially stored treated water to test safety before releaseenergy.gov). As Ebb Carbon scales to larger systems, Bloom Command could provide an integrated dashboard to **monitor pH, alkalinity, and CO₂ uptake in real time** and to coordinate operations with power availability (since their process uses renewable electricityenergy.gov). The system could also assist in **site selection for future deployments** (evaluating factors like bay circulation, marine life sensitivity, and proximity to renewable energy). Ebb's public-private model highlights the need for transparent, adaptive control – an ideal early use-case for Bloom Command to prove out value in multi-actor, regulated environments.
- **Project Vesta** – *Non-profit project (USA)* – **Method:** Coastal enhanced weathering – adding the mineral **olivine sand** to beaches and nearshore waters to increase alkalinity and sequester CO₂. **Region:** USA & Caribbean (pilot sites in New York, Florida, Caribbean). **Fit:** Vesta is a pioneer of “Coastal Carbon Capture.” In summer 2024, they executed a major pilot in Duck, North Carolina, depositing 6,500 cubic yards of olivine sand on the seabed ~1,500 feet offshorecoastalreview.org. This project, under federal and state permits, is testing if dissolving olivine can **permanently remove CO₂ and reduce ocean acidity** at a significant scalecoastalreview.orgcoastalreview.org. Vesta is monitoring the site for 2–3 years with partners to measure dissolution and carbon uptakecoastalreview.org. They note that *no one else globally is yet doing such coastal pilots*, and estimate this trial could remove ~5,000 tCO₂ if successfulcoastalreview.org. A real-time coordination system could greatly aid Vesta by **integrating sensor networks (buoys, water samples, CO₂ flux measurements)** and by helping plan **when to deploy additional mineral and where**. It could track how weather events (storms, currents) redistribute the olivine and suggest adaptive management (e.g. repositioning sand or pausing additions during certain ocean conditions). As Vesta looks to expand (possibly linking with beach nourishment projectscoastalreview.org), Bloom Command would be invaluable for **multi-site coordination**, ensuring each coastal deployment is timed and sized for optimal carbon capture and minimal ecological impact.
- **Running Tide** – *For-profit startup (USA)* – **Method:** Open-ocean macroalgae cultivation and **sinking** for carbon sequestration, sometimes with added alkaline materials. **Region:** North Atlantic (trials near North America and Iceland). **Fit:** Running Tide has tested a system of deploying **kelp-growing buoys** that drift and eventually sink, carrying carbon to the deep ocean. In 2021, with scientific advising from Ocean Visions, Running Tide conducted field trials of open-ocean kelp farming for carbon sequestrationoceanvisions.org. The concept is to leverage natural ocean biological pumps by growing seaweed (which

absorbs CO₂) and then exporting that biomass to the deep ocean carbon pool. This approach is inherently challenging to coordinate – it involves tracking free-drifting devices, optimizing growth duration, and selecting drop zones. Bloom Command could assist Running Tide by providing **ocean condition forecasts (currents, temperature, nutrients)** to decide *when and where to deploy kelp micro-farms*, and by tracking each deployment's trajectory and carbon fate in real time. It could also coordinate supporting infrastructure like monitoring vessels or drones. While Running Tide has faced scientific scrutiny, the need for a robust operational system to manage such ocean interventions is clear. A tool to dynamically adjust operations (e.g. if a bloom isn't growing well, or an eddy could prematurely beach the kelp) could significantly increase the chances of success and verification.

- **Captura – Project spinoff from Caltech (USA) – Method: Direct ocean CO₂ capture** using electrodialysis to remove CO₂ from seawater. **Region:** USA (California pilot). **Fit:** Captura, an XPRIZE Milestone winner [cleantechnica.com](https://www.cleantechnica.com), builds systems that take in seawater, use an electric current and membranes to induce CO₂ outgassing, then capture and concentrate that CO₂ for storage. This approach basically uses the ocean as the “air contactor,” which can be more efficient since CO₂ is ~150× more concentrated in seawater than [air.gov.uk](https://www.air.gov.uk). A small pilot (100 tons/year scale) has been operated, and Captura is looking to scale up in locations like Southern California. Coordination needs include **managing intake and outflow with ocean tides**, ensuring the treated water released back can re-absorb atmospheric CO₂ efficiently. A system like Bloom Command can integrate real-time data on ocean chemistry and temperature to **optimize the electrodialysis process**, and suggest ideal times (e.g. during certain tidal flows) to run the system for maximum uptake [gov.uk](https://www.gov.uk). As Captura expands (potentially to offshore platforms or ships), a centralized coordination platform would be essential to manage multiple units at sea.
- **Ocean Visions and OAE Research Consortia – Non-profit consortium & academic partnerships (International) – Method:** Various ocean CDR (including alkalinity enhancement). **Region:** Global (projects in EU, North America). **Fit:** Ocean Visions is a network linking research institutions (like GEOMAR in Germany, MBARI in the US) and startups to advance ocean-based CDR. They have an **Ocean Alkalinity Enhancement “Launchpad” program** and are advising demonstration projects such as **SEA MATE** (electrochemical alkalinity via renewable energy) oceanvisions.org. They maintain a field trial database and facilitate best practices. Such consortia could use Bloom Command as a **shared platform for coordinating field experiments** – for example, scheduling the release of alkaline material in test sites, or synchronizing multi-site experiments (one team might add alkalinity while another measures downstream effects). Researchers could plug in model forecasts and get recommended deployment plans that minimize risks to marine life. Essentially, Bloom Command can serve as the “mission control” for collaborative experiments, accelerating learning in this nascent field.

*(Note: Ocean-based approaches are emerging quickly. Other noteworthy efforts: **Vesta** (mentioned above) blends ocean alkalinity with coastal projects. **Blue Planet Hawaii** and **ARC Marine** are exploring mineral addition via artificial reefs. **Seafields** (UK) plans open-ocean sargassum seaweed farms for carbon export. **Brilliant Planet** (UK) grows microalgae in coastal desert ponds and buries the dried biomass. Each of these would require significant coordination of environmental variables – making them strong candidates for early Bloom Command pilots.)*

Enhanced Weathering (On Land & Coastal)

Enhanced rock weathering (ERW) involves spreading finely crushed silicate rocks (like basalt) on land to accelerate the natural CO₂ sequestration process. There is also overlap with OAE when weathering is done in coastal environments (e.g. olivine sand on beaches). The ERW space includes startups deploying on farms, large demonstration projects, and research trials – all of which face questions of **where, when, and how much rock to distribute** for optimal effect. Key organizations:

- **UNDO – For-profit startup (UK) – Method:** Enhanced rock weathering on agricultural lands (spreading crushed basalt and other silicates). **Region:** United Kingdom (expanding to North America). **Fit:** UNDO (formerly known as the Future Forest Company) is a leading ERW company. They've partnered with farmers to apply basalt rock dust to fields, improving soil and locking away CO₂ for tens of millennia. Microsoft made its first-ever ERW credit purchase from UNDO in 2023 (5,000 tCO₂ via 25,000 tons of basalt spread in the UK) un-do.com. In 2024, Microsoft expanded the deal – UNDO will spread **65,000 tons of crushed rock** across the UK and parts of **Canada (using wollastonite)**, to remove **15,000 tCO₂** un-do.com. This ramp-up involves managing multiple rock sources, land sites, and verification efforts across countries. Bloom Command could greatly assist UNDO by **identifying the best fields** (considering factors like soil pH, climate, crop type) to deploy rock for maximum CO₂ uptake, and by **timing applications** (e.g. before rain or during tilling seasons so rock reacts efficiently and integrates into soils). It can also coordinate the logistics – matching quarries' output to farm schedules – and track the carbon removal in

near-real time for reporting to buyers. As UNDO's operations span the UK and North America, a centralized coordination and optimization tool would be invaluable for scaling efficiently and maintaining their lead in the ERW marketun-do.com.

- **Lithos Carbon** – *For-profit startup (USA)* – **Method:** Spreading basalt rock dust on croplands, with data-driven monitoring. **Region:** United States (pilots in several states). **Fit:** Lithos is an American ag-tech startup that launched in 2022 and quickly grew to treat over 1,000 acres with basalt by that year's end[geekwire.com](https://www.geekwire.com/2022/lithos-carbon/). They use software to **customize basalt application** based on soil chemistry and crop needs, and they measure carbon uptake in the field with high accuracy[geekwire.com](https://www.geekwire.com/2022/lithos-carbon/). In fact, Lithos became the largest supplier of enhanced weathering credits to the Frontier carbon removal buyers' coalition, due to their early deployments[geekwire.com](https://www.geekwire.com/2022/lithos-carbon/). A platform like Bloom Command aligns perfectly with Lithos's approach: it can ingest their soil and rain data, then **optimize where to apply rock dust and in what quantity** on each farm for both carbon and yield benefits. It can also help coordinate **timing with farmers' planting or irrigation schedules** (to ensure basalt is applied when and where it will be most effective). Essentially, Bloom Command could amplify Lithos's existing software capabilities, enabling a larger network of participating farms to be managed with precision. This increases both the climate impact and the co-benefits (like enhanced crop yields) of their projects[geekwire.com](https://www.geekwire.com/2022/lithos-carbon/)[geekwire.com](https://www.geekwire.com/2022/lithos-carbon/).
- **Project Vesta** – *Non-profit (USA)* – **Method:** Coastal enhanced weathering with olivine (already described in Ocean section). **Region:** Caribbean, USA. **Fit:** (Refer to Vesta entry in OAE section above for details.) In the ERW context, Vesta is unique in focusing on *coastal* deposition, but the logistical challenges (mining, transporting, and distributing large quantities of green sand) are similar to land-based ERW. Bloom Command could help Vesta just as it would land ERW – by planning **where to deploy olivine (which beaches, how far offshore) and when (taking into account storm seasons and tourist usage)**, and by monitoring the dissolution rates via sensors. This coordination ensures maximum CO₂ uptake per ton of olivine and helps address stakeholder concerns through data transparencycoastalreview.orgcoastalreview.org.
- **University of Sheffield “UK ERW Demonstrator”** – *Government/Academic program (UK)* – **Method:** Field trials of enhanced rock weathering on farms, as part of a national Greenhouse Gas Removal effort. **Region:** United Kingdom (multiple field sites in England and Wales). **Fit:** The UK government is funding large-scale GGR Demonstrators, and one led by University of Sheffield focuses on ERW. They are spreading crushed silicate rocks on farmland at sites in Wales, Devon, and Hertfordshire, studying CO₂ removal rates, impacts on soil health, and scalability[sheffield.ac.uk](https://www.sheffield.ac.uk)[sheffield.ac.uk](https://www.sheffield.ac.uk). This project must coordinate across diverse locations and measure a host of variables (soil carbon, crop responses, runoff chemistry). A coordination system would enable the research team to **synchronize field operations** (e.g. ensuring rock spreading and sampling are timed with weather events), aggregate data from all sites in real time, and adjust experimental plans on the fly. Moreover, the demonstrator involves stakeholders (farmers, local communities), so a Bloom Command dashboard could also serve to inform and involve these stakeholders by showing live progress (building trust and social license). If this UK ERW network moves toward actual deployment (beyond trials), the system could scale with it – effectively becoming the control center for a **national ERW program**, deciding where additional rock applications would yield the best carbon returns for the UK's net-zero goals[sheffield.ac.uk](https://www.sheffield.ac.uk).
- **Carbin Minerals** – *Spin-off from University of British Columbia (Canada)* – **Method:** Accelerated mineral carbonation in mine tailings and ultramafic rocks (“mineralization” approach). **Region:** Canada (with global applications at mine sites). **Fit:** Carbin Minerals won the XPRIZE Milestone in the “Rocks” category[cleantechnica.com](https://www.cleantechnica.com) for its work on speeding up CO₂ uptake in mine wastes (like nickel tailings). They are essentially an enhanced weathering approach applied to industrial residues. Their deployments will be at **operating mines or legacy tailings piles**, which means coordinating with mining schedules, slurry handling, and monitoring water chemistry. A real-time system can help Carbin **identify optimal mine sites worldwide** (considering climate – e.g. rainfall enhances carbonation – and composition of tailings), and then help manage the process on-site (e.g. when to add certain catalysts or how to distribute moisture for optimal reactions). Mining companies value predictability and safety, so Bloom Command's ability to closely monitor gas fluxes and geochemical parameters could de-risk these projects and provide the verified data needed for carbon crediting. Carbin's work, by nature, will be **international** (wherever mines exist), making a centralized coordination and data system critical for consistent operation across jurisdictions.

(Other ERW and mineralization efforts: Nori & Eion (USA) are working with farmers to spread rock dust; U.N. Climate Champions' MRCGI initiative is looking at mining residues for CO₂ storage. Aramco in Saudi Arabia has researched injecting CO₂ into basalt formations (in-situ mineralization). All these indicate a broad need to coordinate between source (quarries or industrial waste) and sink (fields or geologic formations), and to time interventions with environmental conditions. Bloom Command could serve as the digital backbone for these efforts, making it easier for operators to plan and verify negative emissions.)

Afforestation & Reforestation

Afforestation (planting new forests on non-forested land) and reforestation (replanting deforested areas) are **natural climate solutions** with significant carbon drawdown potential. Unlike engineered removals, tree-planting initiatives involve managing living systems over years, and coordinating at **landscape scale** with many stakeholders. Challenges include selecting sites, choosing species, ensuring seedlings survive (which depends on timing with seasons/rainfall), and monitoring growth. Organizations leading large tree-planting efforts range from nimble tech startups to huge government programs:

- **Terraformation** – *For-profit startup (USA)* – **Method:** Enabling rapid reforestation via **off-grid seed banks, nursery kits, and training** for local partners. **Region:** Global (HQ in Hawaii; projects in Africa, Latin America, etc). **Fit:** Terraformation focuses on solving bottlenecks to scaling forests, notably the shortage of **native seeds**. They build solar-powered, modular seed bank containers and provide them to reforestation teams worldwide terraformation.com/businesswire.com. For example, they partnered with **Eden Reforestation Projects in Kenya** by delivering three seed bank units to support restoration at 40 sites terraformation.com. Each seed bank can store up to 10 million seeds (enough to restore 15,000 acres) terraformation.com. Terraformation's model involves coordinating many independent reforestation efforts by equipping them with infrastructure and knowledge. A system like Bloom Command could enhance this by **tracking seed inventories, forecasting planting needs, and aligning seed supply with planting seasons** across all partner sites. It could also gather data from field partners (seedling survival rates, growth) and help Terraformation optimize where to deploy their next seed banks or nursery kits for maximum impact. Essentially, as Terraformation decentralizes the physical work of tree planting, Bloom Command would provide a centralized intelligence to ensure all those projects collectively hit their targets and learn from each other's data.
- **Eden Reforestation Projects** – *Non-profit NGO (USA with global operations)* – **Method:** Large-scale community-based tree planting and ecosystem restoration. **Region:** Global South (active in 10+ countries: e.g. Kenya, Mozambique, Madagascar, Nepal, Haiti, Indonesia, Brazil). **Fit:** Eden is one of the world's most prolific reforestation NGOs, known for employing local villagers to plant native trees at a massive scale while alleviating poverty. They have **planted over 331 million trees** across 8 countries (as of recent counts) and created over 3.3 million workdays in the process terraformation.com. In Kenya alone, since 2020 Eden planted 50 million trees and plans at least 40 million more in the next year terraformation.com. Coordinating this level of activity is a huge challenge – it involves **selecting planting sites** (often remote), managing nurseries, timing plantings with rainy seasons, and continual monitoring to ensure forests survive. Bloom Command could provide Eden with a powerful tool to **centralize planning and tracking**: for example, it can use satellite data and climate models to suggest when the rains will start so that Eden's teams know when to plant in each region. It can also help prioritize areas (via geospatial analysis of deforestation rates or watershed needs) for new projects, and coordinate logistics (seedling deliveries, workforce allocation) among the 80+ project sites Eden operates terraformation.com. Given Eden's emphasis on verification for carbon and biodiversity outcomes, a real-time system would also help aggregate monitoring data, flag any issues (like drought stress or pest outbreaks in new plantations), and adapt management accordingly. Essentially, Eden's **international, distributed operations** are a prime beneficiary of a deployment optimization platform to maximize tree survival and growth – thereby maximizing carbon sequestration and community benefits.
- **DroneSeed (Mast Reforestation)** – *For-profit startup (USA)* – **Method:** Post-wildfire reforestation using **drones and technology** to plant and seed large areas quickly. **Region:** North America (focused on U.S. West). **Fit:** DroneSeed (recently rebranded as Mast Reforestation after acquisitions) tackles the urgent need to replant forests after mega-fires in the western U.S. They use swarms of heavy-lift drones to disperse seed vessels across difficult terrain, and have vertically integrated by acquiring seed collection and nursery businesses. This is a highly **time-sensitive operation** – there is a window after a wildfire (and before invasive weeds take over) when planting is most effective. Bloom Command could significantly aid Mast by **analyzing burn area data and prioritizing which areas to seed first** (based on erosion risk, microclimate, etc.), and by coordinating the deployment of drone teams to those areas when conditions (like soil moisture, weather) are right. The system could ingest real-time weather and even drone telemetry, then give go/no-go recommendations for missions. As Mast scales up to address multiple fires across states, a centralized coordination platform ensures they allocate their resources optimally (e.g. which burn to treat on a given week) and track the outcomes. Mast's business relies on hitting targets for trees per acre – Bloom Command can help maximize that by guiding the where and when of each aerial seeding campaign.
- **Great Green Wall (Africa)** – *Multi-government initiative (Africa Union & partners)* – **Method:** Massive landscape restoration (trees and other vegetation) across the Sahel region to combat desertification. **Region:** 11 countries across North Africa and the Sahel (Senegal to Djibouti). **Fit:** The Great Green Wall (GGW) is an ambitious program aiming to **restore 100 million hectares of degraded land by 2030**, sequester 250 million tons of carbon, and create 10 million jobs in rural Africa unccd.int.

Progress to date has been steady but slow – as of 2022 about **18 million hectares have been restored and 350,000 jobs created**[uncd.int](https://www.uncd.int). The GGW involves numerous national governments, local communities, and NGOs working in different countries under a common banner. A coordination and optimization system could be a game-changer for the GGW: it would allow planners to **share data on what's working in each zone, coordinate cross-border efforts**, and use environmental data to adjust strategies. For example, Bloom Command could highlight that a certain tree species is thriving in semi-arid Mali but failing in Niger, informing species selection. Or it could schedule planting waves based on forecasted rainfall across the Sahel (since timing with rain is critical for seedling survival). It could also track progress in near-real-time via satellite, giving the GGW Secretariat and funders a clear view of where efforts are succeeding or lagging. Essentially, Bloom Command could act as the “mission control” of the Great Green Wall, helping a vast, multinational effort operate with the agility and feedback of a tech-enabled project rather than a loose patchwork. Early engagement with GGW coordinators would provide Bloom Command with a high-profile use case and vast amounts of deployment data to further improve the system.

- USDA Forest Service Reforestation Programs – Government agency (USA) – Method:** Replanting U.S. national forests, especially after wildfires, via nurseries and partnerships (enabled by the REPLANT Act). **Region:** United States (national forests in multiple states). **Fit:** The U.S. Forest Service (USFS) is ramping up reforestation dramatically – aiming to **plant over 1 billion trees in the next decade** to address a 4 million acre reforestation backlog[usda.gov](https://www.usda.gov). This push, funded by 2021's REPLANT Act and bipartisan support, quintuples the scale of federal replanting efforts[usda.gov](https://www.usda.gov/usda.gov). Implementing this will require coordinating dozens of nurseries, thousands of planting crew members, and careful timing around seasons and post-fire conditions. A Bloom Command system tailored to USFS needs could help **prioritize which burned areas or degraded lands to reforest first** (using criteria like watershed importance or climate resilience), and ensure that **nursery production matches those needs** (so the right species and quantities of seedlings are grown and delivered on time). It can also integrate climate change projections – for instance, guiding the choice of tree species or seed provenance for each site to maximize future survival (climate-smart reforestation). The system can provide a real-time map of planting progress across the country, allowing the Forest Service to dynamically allocate crews and resources (if one region's planting window closes early due to drought, shift effort to another region). Because the USFS works with many partners (state agencies, tribes, NGOs like American Forests), a centralized coordination platform would foster collaboration and transparency among all parties. Engaging the USFS early not only opens a large market (the public sector) for Bloom Command, but it directly contributes to hitting national climate and conservation targets through more **efficient and optimized reforestation**[usda.gov](https://www.usda.gov).
- Trillion Trees & World Wildlife Fund (WWF) – Public-private coalition (Global) – Method:** Advocacy and support to conserve, restore, and grow 1 trillion trees globally by 2030 (multi-organization effort). **Region:** Global (umbrella for many projects). **Fit:** The **Trillion Trees initiative** (a partnership of WWF, BirdLife International, and Wildlife Conservation Society) and the related [↑ A platform for the trillion trees community.](https://www.weforum.org/initiatives/trillion-trees) platform (World Economic Forum) are not single implementers, but facilitators of many afforestation/reforestation pledges around the world. They aggregate commitments and help channel funding and knowledge. For Bloom Command, these initiatives represent a *network of potential users*. By connecting with Trillion Trees, Bloom Command could be introduced to numerous local projects that have pledged large-scale restoration. The platform could serve as a unifying **monitoring and coordination tool** for these dispersed projects – offering each of them the ability to plan better, while also giving the global initiative a way to **track overall progress toward the trillion-tree goal**. For example, if 50 organizations in 30 countries report into Bloom Command, the Trillion Trees coalition can see the aggregated number of trees planted, survival rates, and carbon sequestered, all in one place, updated in real time. This makes identifying gaps (geographies or methodologies that need help) much easier. Additionally, best practices (like optimal planting densities or techniques) could be codified into the system so every new project benefits from past lessons. Engaging with such high-level initiatives would position Bloom Command as the go-to platform for **managing nature-based climate solutions at scale** – with early pilots in a variety of global contexts sharpening the platform's versatility.

(Additional noteworthy organizations: The Nature Conservancy (TNC) runs a global “Plant a Billion Trees” program focusing on biodiversity hotspots (e.g. Brazil's Atlantic Forest, East Africa, China) – a good fit due to TNC's science-based approach.

American Forests (US NGO) develops tools like the Reforestation Hub and sponsors large-scale plantings, potentially a tech partner. Many national governments (China's Three-North Shelterbelt “Great Green Wall of China”, Pakistan's 10 Billion Tree Tsunami, India's Green India Mission) are scaling tree planting; these efforts would benefit from improved coordination and transparent tracking, which Bloom Command can offer. Reaching out to such programs could yield pilot collaborations, though government timelines might be longer. Regardless, the critical common need is **decision-support for where/when to plant and how to manage forests long-term**, which is exactly the gap Bloom Command fills.)

Solar Radiation Management (SRM) & Solar Geoengineering

Solar Radiation Management is an emerging and controversial climate intervention, focused on reflecting a portion of sunlight to cool the Earth. While no entity is *actively deploying* SRM at scale today, there are several research programs and small-scale field experiments in development. **These groups would benefit from a real-time coordination system to manage experiments, model predictions, and (if ever approved) actual deployments** of SRM techniques. Early engagement here is strategic: Bloom Command could become the default safety and control platform if SRM moves forward. Key organizations and initiatives:

- **Harvard University's SCoPEX** – *Academic research project (USA)* – **Method:** Stratospheric Controlled Perturbation Experiment – a small balloon-based release of aerosols in the stratosphere to study dispersion and effects. **Region:** USA (initial test proposed in Sweden). **Fit:** SCoPEX, led by Harvard professors, aims to inject a tiny amount of reflective particles ~20 km high to observe how they disperse – improving models for *stratospheric aerosol injection* (SAI) as a potential cooling strategy en.wikipedia.org. The experiment has faced delays due to governance concerns, but technically, it involves coordinating high-altitude balloons, real-time atmospheric measurements, and ensuring the perturbation is well-controlled. Bloom Command would be invaluable for such an experiment: it could integrate high-altitude weather forecasts (winds, temperature) to **pick the perfect launch window and trajectory** for the balloon, and then control the release amount to meet the experiment design. During flight, the system could assimilate sensor data (particle concentrations, light scattering) and adjust the balloon's position or release accordingly. Crucially, for risk management, Bloom Command can provide **real-time monitoring and automated safety cut-offs** (for instance, if the balloon veers off course or if winds threaten to carry particles outside the test zone). While SCoPEX is small, demonstrating Bloom Command on it would pave the way for managing larger SAI experiments in the future. It also addresses the transparency concern: a trusted system showing exactly what is happening in real time would increase confidence among stakeholders.
- **Marine Cloud Brightening (MCB) Projects** – *Research collaborations (USA & Australia)* – **Method:** Spraying fine mist of seawater into marine clouds to make them more reflective, thereby cooling the region. **Region:** USA (University of Washington-led program), Australia (Great Barrier Reef cloud brightening trials). **Fit:** **University of Washington's Marine Cloud Brightening Program** is an open collaboration studying how aerosols brighten clouds, with the aim of developing marine cloud brightening as a way to limit warming atmos.uw.edu/atmos.uw.edu. Separately, in Australia, researchers supported by the Reef Restoration and Adaptation Program conducted the world's first outdoor MCB trials on the Great Barrier Reef in 2020–2024, using sprayers to loft saltwater droplets and observing the effects on cloud reflectivity en.wikipedia.org en.wikipedia.org. Both efforts are experimental and involve intensive monitoring (weather radars, cloud cameras, aerosol sensors) to gauge results. A coordination system could significantly enhance MCB experiments: it would **analyze real-time cloud conditions and guide when and where to activate spray devices** for maximum brightening effect. For example, Bloom Command could process satellite imagery and recommend deploying aerosols into *just the right stratocumulus clouds* that have the potential to brighten en.wikipedia.org en.wikipedia.org. It can also ensure experiments shut down if conditions stray from safe bounds (avoiding unintended weather impacts). In the Great Barrier Reef context, where the goal is to cool reef waters during marine heatwaves, Bloom Command could be used operationally to **trigger cloud brightening operations exactly when a heatwave is forecast** and coordinate a fleet of spray vessels/drones over hundreds of kilometers. The complexity of predicting and influencing cloud behavior begs for an AI-driven coordination tool – making MCB a prime candidate for Bloom Command's capabilities.
- **SilverLining (Safe Climate Research Initiative)** – *Non-profit organization (USA)* – **Method:** Funding and guiding research into climate intervention, particularly cloud brightening and atmospheric science. **Region:** USA-based, funds projects globally. **Fit:** SilverLining is an NGO that advocates for prudent research into SRM. They have funded supercomputer simulations of SRM and observational studies of cloud-aerosol effects. While not deployers themselves, they coordinate a network of scientists and projects. For Bloom Command, SilverLining could be a valuable partner by using the platform as a **common operating picture for all their funded research**. For instance, if they fund an MCB experiment and a separate high-altitude aerosol dispersion test, Bloom Command can integrate both, providing a unified view of when/where experiments are happening and their initial outcomes. Over time, SilverLining could push for an "SRM testbed" using Bloom Command to link modeling teams with field teams – the modelers set scenarios in the system, the field teams attempt them, and data loops back to improve models. This is more of an indirect use-case but positions Bloom Command at the center of SRM knowledge-building. It's about **optimizing learning**: since actual deployment might be years away, the near-term goal is to learn as much as possible per experiment, which a coordination system can maximize.

- **The Degrees Initiative** – *Non-profit (UK-based, global reach)* – **Method:** Funding and mentoring scientists in the Global South to research solar geoengineering (mostly via simulation and impact studies). **Region:** Global South (multiple countries). **Fit:** Formerly known as SRM Governance Initiative, the Degrees Initiative doesn't conduct physical interventions but sponsors many climate modeling studies to understand how SRM might affect different regions. If physical SRM field experiments begin, scientists from developing countries will want to be involved and have access to data. Bloom Command could serve as the inclusive platform that **shares live data and controls with a distributed research community**. For example, if an experiment releases aerosols, researchers in Africa or Asia (supported by Degrees Initiative) could log into Bloom Command to see how the plume is evolving and compare it to their model predictions. This democratization of experiment data ensures capacity building and transparency – things the Degrees Initiative actively promotes. By engaging this group, Bloom Command can position itself as the **open-access coordination tool for SRM research**, rather than something proprietary or closed – helping assuage some governance concerns. In the long run, if any SRM deployment were ever globally authorized, having international researchers already fluent in the system would facilitate cooperative decision-making (e.g. choosing where to inject aerosols to maximize benefits and minimize harms across regions).
- **National Oceanic and Atmospheric Administration (NOAA)** – *Government agency (USA)* – **Method:** Monitoring and research of atmospheric composition; developing frameworks for climate intervention research. **Region:** United States (with global observations network). **Fit:** NOAA has been tasked by the U.S. Congress to oversee research into climate interventions including SRM. They've held workshops on marine cloud brightening and are improving observational tools for aerosols research.noaa.gov/acp.copernicus.org. If the U.S. were to begin federal SRM outdoor experiments, NOAA would likely lead the implementation (with NASA for balloons or the Air Force for aircraft). Bloom Command could be pitched as the **mission control software for any NOAA-run SRM experiment** – integrating their state-of-the-art climate and weather data with on-the-ground (or in-the-air) operations. For instance, NOAA could use it to coordinate an experiment where one of their research aircraft releases aerosol and others measure the results; the system would help choreograph the flights and rapidly assimilate measurement data to update forecasts of the aerosol spread. Given NOAA's emphasis on **scientific rigor and safety**, Bloom Command's ability to enforce safety limits (like not exceeding a certain optical depth of aerosols) and to log all actions for review is a strong asset. Early outreach to NOAA's Climate Program Office and Earth Systems Research labs could identify small pilot opportunities (maybe integrating Bloom Command with an upcoming high-altitude aerosol observation campaign). Success there could lead to Bloom's adoption in larger agency-led climate intervention trials down the line.

*(Outlook on SRM: While full-scale deployment of SRM is not imminent, the **decision-making and coordination challenge** it poses is enormous – exactly the kind of complex, data-driven scenario Bloom Command is built for. By engaging the above research programs now, Bloom can co-develop features like constraint handling (never exceed certain aerosol concentrations), multi-objective optimization (maximize cooling, minimize precipitation disruption), and global stakeholder communication tools. These features will not only serve SRM research but can loop back to improve the platform for more near-term interventions like DAC or afforestation by handling complexity and risk. In short, SRM is a high-reward area for early involvement: it's international, interdisciplinary, and will require **unprecedented transparency and control**, giving Bloom Command a chance to shine as the go-to coordination system if/when the world ever trials climate geoengineering.)*

Conclusion

Across these categories – from engineered removal startups to natural climate solution nonprofits to cutting-edge research consortia – a common theme emerges: **the need for intelligent coordination of when and where climate interventions are deployed**. All the listed organizations are pushing into new frontiers, whether it's building first-of-kind DAC plants or planting trees by the billions. They face uncertainties in weather, ecosystems, and logistics that make real-time optimization difficult but vital for success. Bloom Command's value proposition resonates strongly here: by ingesting data (environmental, operational) and providing decision support, it can increase the effectiveness and reduce the costs/risks of interventions. Early outreach to these high-impact players will not only identify pilot customers for Bloom Command's MVP, but also ensure the system is shaped by the most practical and immediate needs in the climate intervention landscape.

Each category above contains a mix of **for-profit startups** (likely fast movers who could pilot software quickly), **large operators and corporates** (scaling projects that need robust systems), **NGOs/non-profits** (mission-driven, likely to share data and prioritize transparency), **government initiatives** (big scale, looking for oversight tools), and **research groups** (innovation-focused, will push the system's capabilities). Engaging a representative from each segment – for example: Climeworks (startup), Drax's BECCS

program or Oxy's 1PointFive (corporate), Eden or WWF (non-profit), USFS or GGW (government), and Harvard MCB or UK ERW demo (research) – would give Bloom Command a comprehensive understanding of user requirements and pave the way for broad adoption. The international span (North America, Europe, Asia, Africa, Oceania represented in the list) ensures Bloom Command is relevant in **global markets**, not just the U.S., reflecting the global nature of the climate challenge.

Finally, these organizations are ideal **early interview candidates**. They are actively grappling with on-the-ground deployment decisions and would have the clearest perspective on what features a “climate intervention command center” should have. By prioritizing outreach to the above list, Bloom Command can assemble a powerhouse cohort of design partners and pilot users, each of whom could become anchor customers and evangelists if the product demonstrably helps them scale their positive climate impact.

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