

Five-year Strategic Plan

May 26, 2021

North American Regional Office of Astronomy for Development 2021 - 2026 Strategic Plan

About the NA-ROAD: The International Astronomical Union (IAU) North American Regional Office of Astronomy for Development (NA-ROAD) is a collaboration that includes the Adler Planetarium in Chicago, IL, Associated Universities, Inc. (AUI) in Washington, D.C., Association of Universities for Research in Astronomy (AURA) in Baltimore, MD, Geneva Lake Astrophysics and STEAM, (GLAS Education) in Williams Bay, WI, and the OAD in Cape Town, South Africa. The Adler Planetarium connects people, communities, and institutions to one another through the wonder of frontier space science so we can explore our Universe together and use our collective knowledge and skills to create a better world for everyone. AUI is a non-profit research management organization established in 1946, dedicated to planning, building, and operating large national and international scientific facilities, to cultivating scientific and operational excellence, delivering value, enhancing education, and engaging the public. AURA is a group of U.S. universities with a common interest to create astronomical observing facilities that would be available for use by all qualified researchers from U.S. institutions and universities on the basis of scientific merit. GLAS, composed of former Yerkes Observatory staff with experience and expertise in observing, telescope operations, fiscal management, program development and management, and accessibility in STEM, brings quality STEM programming to the underserved and underrepresented.

The NA-ROAD governing structure is unique compared to other ROADs. Adler, AUI, AURA, GLAS and a representative from the OAD make up the NA-ROAD Governing Council. The partners maintain independent financial infrastructure at their respective organizations and maintain full responsibility for their organization's finances. The Council is responsible for the planning, approval and implementation of all NA-ROAD activities and for identification and appointment of the official representative from the NA-ROAD to the OAD. The Governing Council will meet on alternate weeks to discuss and vote on matters related to the NA-ROAD.

It is important to note that while Adler, AUI, AURA, and GLAS are the current partners in the NA-ROAD via a signed Memorandum of Understanding MoU, efforts will be made moving forward to add additional partners from countries being served by the NA-ROAD. Further, following strategic planning, the NA-ROAD plans to seat an advisory body that will provide input to the NA-ROAD Governing Council.

The Strategic Planning Process

In an effort to better understand the needs of North America, the NA-ROAD conducted a Needs Assessment during the summer of 2020. Due to COVID-19 the Needs Assessment included an online survey only (See https://www.surveymonkey.com/r/NA_ROAD_Needs for survey). For the purpose of the survey, we defined North America to include the United States and U.S. Territories, Canada, Mexico, Greenland, and several island nations of the Caribbean. We had a good response

to the Needs Assessment; more than 200 people in total responded, 172 from the U.S., 24 from Mexico, 13 from Canada, a few from the Caribbean nations, and none from Greenland. The results of the needs assessment and the established mission and goals of the OAD served as the foundation for the strategic plan.

The Strategic Planning Committee: The NA-ROAD Governing Council identified nine theme categories from which Committee members were identified, including a) astronomy for diplomacy, b) astronomy facilities for communities, c) astronomy for STEAM education for traditionally underrepresented groups (URM), d) astronomy for gender/racial equity, e) astronomy for light pollution mitigation, f) astronomy for Indigenous persons, g) astronomy for capacity building, h) astronomy for economic development, and i) astronomy for sustainability. The Governing Council then worked to select a Committee that brought to the strategic planning process expertise and experience from all nine categories, ensuring diverse representation. Individuals were identified via previous experience with Governing Council members and/or those who participated in the Needs Assessment. The Strategic Planning Committee included:

- **Chad (Kalepa) Baybayan**, ‘Imiloa Astronomy Center, Hawaii - USA
- **Ana Torres Campos**, Social Communication and Digital Media Officer at the Large Millimeter Telescope Alfonso Serrano - Mexico
- **Yasmin Catricheo**, Sr. STEM Education Officer at AUI, Washington DC - USA
- **Jose E. Garcia**, Founder and CEO of Kosmos Scientific de México, Monterrey, Mexico
- **Hussein Jirdeh**, Head of Communications and Public Outreach, Space Telescope Science Institute, Baltimore, MD - USA
- **Deb Kaelbli**, CFO & Treasurer at GLAS Education, Williams Bay, WI - USA
- **Ka'iu Kimura**, Executive Director, ‘Imiloa Astronomy Center, Hawaii - USA
- **Shari Lifson**, Corporate Communications Coordinator, AURA, Baltimore, MD - USA
- **Ameerah McBride**, Chief Diversity Officer, AURA, Tucson, Arizona - USA
- **Kate Meredith**, President & Director of Education at GLAS Education, Williams Bay, WI - USA
- **George Miley**, Leiden University, ex-Vice President IAU, Initiator IAU Astronomy for Development program
- **Rulx Narcisse**, co-Founder and President of the Haitian Astronomical Society, Haiti
- **Hilding Neilson**, Assistant Professor, David A. Dunlap Department of Astronomy & Astrophysics, University of Toronto, Canada
- **Nathalie Ouellette**, JWST Outreach Scientist and Coordinator, Institute for Research on Exoplanets, Université de Montréal, Canada
- **Carmen Pantoja**, Professor, Department of Physics, University of Puerto Rico-Río Piedras
- **Tim Spuck** - Director of Education and Public Engagement at AUI, Washington DC - USA

- **Laura Trouille**, VP of Science Engagement and Visualization, the Adler Planetarium, Zooniverse Co-PI

The NA-ROAD Strategic Planning Committee met for a total of six 1.5-hour virtual work sessions. Through these work sessions the group reviewed the results of the Needs Assessment, synthesized goal statements, and refined related text and projects, programs, and initiatives related to the goals, as well as associated tasks. Members of the Governing Council worked to provide further synthesis of the ideas and information provided by the full Strategic Planning Committee.

NA-ROAD Mission, Values, and Goals

The NA-ROAD Mission: The NA-ROAD has adopted the mission statement of the OAD:

The mission of the NA-ROAD is to further the use of astronomy, including its practitioners, skills and infrastructures, as a tool for sustainable development by mobilizing the human and financial resources necessary in order to realize the field's scientific, technological and cultural benefits for society.

NA-ROAD Values: The NA-ROAD will work to ensure that our values are reflected in the work we engage in, and the culture we create. Through a review of each proposed activity, the Office will ask a key question, “How are our values reflected in the proposed activity?” Further, throughout planning and implementation, projects will be assessed for alignment to the NA-ROAD values. It is important to note that not all individual projects will reflect all values all the time, but rather we will ensure our collective portfolio of NA-ROAD activities has strong alignment with our stated values.

United Nations Sustainable Development Goals: The OAD’s vision is “Astronomy for a better world” with the 17 United Nations Sustainable Development Goals as broad objectives for global development. The NA-ROAD values these Development Goals, and we will use them to guide NA-ROAD programs and activities. Further, the application of the Development Goals to astronomy is outlined in *Project Highlights: Stories from the Office of Astronomy for Development* (<https://cloudcape.sao.ac.za/index.php/s/UJAOfQ2VNiMbf9W>).

The Goals outlined here (<https://sdgs.un.org/goals>) include:

1. End poverty in all its forms everywhere,
2. End hunger, achieve food security and improved nutrition, and promote sustainable agriculture,
3. Ensure healthy lives and promote well-being for all at all ages,
4. Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all,
5. Achieve gender equality and empower all women and girls,

6. Ensure availability and sustainable management of water and sanitation for all,
7. Ensure access to affordable, reliable, sustainable, and modern energy for all,
8. Promote sustained, inclusive, and sustainable economic growth, full and productive employment, and decent work for all,
9. Build resilient infrastructure, promote inclusive and sustainable industrialization, and foster innovation,
10. Reduce income inequality within and among countries,
11. Make cities and human settlements inclusive, safe, resilient, and sustainable,
12. Ensure sustainable consumption and production patterns,
13. Take urgent action to combat climate change and its impacts by regulating emissions and promoting developments in renewable energy,
14. Conserve and sustainably use the oceans, seas and marine resources for sustainable development,
15. Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss,
16. Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels, and
17. Strengthen the means of implementation and revitalize the global partnership for sustainable development.

Diversity, Equity and Inclusion: In addition, the NA-ROAD values diversity, equity and inclusion. For the purposes of this strategic planning, we adopt the following definitions from Tuskegee University Cooperative Extension (<https://dei.extension.org/>):

- **Diversity** is the presence of differences that may include race, gender, religion, sexual orientation, ethnicity, nationality, socioeconomic status, language, (dis)ability, age, religious commitment, or political perspective. Populations that have been-and remain-underrepresented among practitioners in the field and marginalized in the broader society.
- **Equity** is promoting justice, impartiality and fairness within the procedures, processes, and distribution of resources by institutions or systems. Tackling equity issues requires an understanding of the root causes of outcome disparities within our society.
- **Inclusion** is an outcome to ensure those that are diverse actually feel and/or are welcomed. Inclusion outcomes are met when you, your institution, and your program are truly inviting to all. To the degree to which diverse individuals are able to participate fully in the decision-making processes and development opportunities within an organization or group.

Indigenous Culture: The NA-ROAD recognizes the history of the land and seas that make up North America, and understands that all territories served by this office are Indigenous in their

origins. We value, and through our activities, will work to honor the historic and current Indigenous peoples, cultures, and the Indigenous land/sea across North America and the globe.

Accessibility: The NA-ROAD understands the importance of being inclusive. We understand that individuals and various groups of people have different needs and we will strive to make the necessary accommodations for their participation. Addressing accessibility for these individuals and groups, whether it be due to physical, economic, or language barriers, will not only increase the diversity of those who engage in our activities, but will also improve the quality and impact of the work we do.

Sustainability: Pollution and climate change are two of the biggest challenges facing humanity today with far-reaching consequences. Further, the negative impact from pollution and climate change are not felt equally across all populations, with the poorest among us often impacted the most. Across NA-ROAD initiatives we value environmentally sustainable practices and seek to incorporate them into projects supported by the NA-ROAD. In addition, economic sustainability is critical. Economic sustainability, as accepted by the NA-ROAD, refers to practices that support long-term economic growth without negatively impacting social, environmental, and cultural aspects of the community. NA-ROAD will focus on developing projects that lead to long-term impact while incorporating both environmental and economic sustainability.

Initiatives and Programs

V1.1 Structural: Develop a list of regions for North America, and contacts for those regions/countries, and get confirmation of participation. (High Importance)

Tasks:

1. Define the region
2. Define what we mean by membership or member countries; what are the benefits/responsibilities
3. Draft a letter/email to send
4. Generate contact list for “representatives” from the various countries/regions in NA
5. Contact potential member countries re: participation
6. Track who responds in positive, negative, and no-responses

Lead: AURA and GLAS supporting

When: 2021 and 2022

Location: NA-Region

Potential Partners/Funders: Possibly Embassies, astronomy researcher/educator in a country.

Cost: Med

V1.2 Structural: Funding for the NA-ROAD office and programs. Both obtaining base funding

for NA-ROAD and setting up structures/processes around how funds will be received and distributed for NA-ROAD programs/initiatives (High Importance)

Tasks:

1. Create a database of potential funders/sponsors for both general support of NA-ROAD operations, and funding specific programs/projects/initiatives.
2. Establish contribution pipeline into the NA-ROAD,
3. Decide what staff are needed and what general funding is needed for Y1-Y5,
4. Draft introduction letter for potential sponsors/general support for NA-ROAD office,
5. Contact potential sponsors/supporters to discuss possible contributions,
6. Secure contributions.

Lead: AURA

When: May 2021 through September 2021 (ongoing)

Location: NA Region

Potential Partners/Funders: NA-ROAD host institutions

Cost: Med

V1.3 Structural: Develop and implement a NA-ROAD Website that communicates our programs and reflects our values. (High Importance)

Tasks:

1. Secure website domain (<http://www.naroad.org>)
2. Figure out who will design the website and what server will host it
3. Design and build the website
4. Ensure translation of website into applicable languages
5. Establish multi-language social media to accompany website

Lead: AUI

When: 2021

Location: NA-Region

Potential Partners/Funders: Current Staff Partners within NA-ROAD; IAU Language Translation Network

Cost: Med

V1.4 Structural: Develop and implement a process the NA-ROAD will use to ensure our values are reflected in our programs and the work we do. Include internal metrics. (High Importance)

Tasks:

1. Create rubric we can use to assess proposed programs, projects, and initiatives to determine importance and how it addresses our values (UN-SDGs, BVI-DHH

accessibility, diversity equity and inclusion, language barriers, indigenous considerations, sustainability, and poverty)

2. Implement the rubric in project review and selection.

Lead: GLAS

When: 2021

Location: NA-Region

Potential Partners/Funders: Government Council, staff, and advisory board; IAU Language Translation Network; Astronomers for Planet Earth (<https://astronomersforplanet.earth/>)

Cost: Med

V1.5 Structural: Seat an Advisory Board representing North American nations/regions, and key ROAD stakeholder groups, that will provide input and constructive critique to the Governing Council related to NA-ROAD activities. (High Importance)

Tasks:

1. Draft roles/responsibilities for the advisory group,
2. Identify participating nations/regions, and stakeholder groups,
3. Identify potential representatives from these groups and reach out to them to gauge interest,
4. Select individuals and establish a meeting schedule.

Lead: AUI

When: April 2021 through June 2021

Location: NA-Region

Potential Partners/Funders: Reps. of AAS?; National Observatories; NASA - Space industry?; Caribbean countries.

Cost: Low

GOAL 1: Advance the use of astronomy for science diplomacy, with collaborative activities that bridge across countries and cultures.

Science for diplomacy is one of the most important Goals for connecting individual efforts around the globe to achieve the largest, sustainable impacts. Diplomacy and collaboration make way for opportunities for projects or advances in science and discovery. Accomplishing this goal will advance SDG 9 (industry, innovation, and infrastructure), 16 (peace, justice, and strong institutions) and 17 (Partnership).

The lack of diplomacy in our own backyard has become news headlines in the last half decade. There is a lot of work to be done to repair the damage between cultures in our own region. The damage has also extended globally with broken partnerships and ties between countries. This period in time seems accurately aligned for these types of relationship mending and the uniting of regions as one global population.

We have become aware of how one Country's actions, inactions, and problems quickly become global problems. Climate change, pandemics, extreme nationalism, and nuclear weapons are some examples of what can happen when each country operates independently with self-interest. These same issues apply nationally when cultures or regions operate independently rather than as one cohesive nation or group of nations. These barriers need to be broken down to unite nations, countries, and cultures around the globe. One of the Flagship projects of the IAU is Science diplomacy through Astronomy: Celebrating our Common Humanity, encouraging social cohesion and celebrating our common humanity through astronomy (Pale Blue Dot). Astronomy has the power to unite and inspire the advancement of technologies while giving perspective surrounding the current political polarization and the needs to be addressed thereof.

As an office centered on North America, we acknowledge that we live on, work on, and benefit from Indigenous lands. Part of our responsibilities, as outlined in numerous treaties, is to ensure any program, communication, publishing, etc. by the NA-ROAD respect the rights of Indigenous Peoples as described by the United Nations Declaration of the Rights of Indigenous Peoples and we respect and support the historical, current and ongoing sovereignty of Indigenous Peoples through a Nation-to-Nation diplomacy.

Initiatives and Programs

G1.1 Structural: Create a database of astronomy for science diplomacy activities and materials available.

Tasks:

1. Participate in discussions at OAO, OAE, OAD family meetings about this need. Understanding existing efforts within this community.
2. Research existing databases of this type. Identify end users and their needs. Partner with

OAE & OAO for shared resources. Check with Observatories and planetariums for material.

3. Add public forum for diplomacy activities and materials

Lead: Adler

When: 2021-2023

Location: International

Potential Partners/Funders: OAE; OAO; OAD

Cost: Med

G1.2 Program: IAU-Astronomy Day international celebration face-to-face with online simultaneous transmission of outreach talks in different languages and global participation in a Zooniverse astronomy project. Maybe take part in UNESCO International Days.

Tasks:

1. Contact OAO to discuss the possibility of establishing this day as an IAU official day.
2. Define the general objective of the project, identify key activities and yearly slogan.
3. Contact possible partners (Astronomy institutes, Observatories, Planetariums) in each country.
4. Contact potential sponsors asking for economical support
5. Build a website and social media
6. Contact professional astronomers and astronomy outreach asking to volunteer for the organization of the activities.

Lead:

When: 2023

Location: International

Potential Partners/Funders:

Cost: Med

G1.3 Program: Youth Advocate for Astronomy Contest.

Tasks:

1. Contact Young Astronomers Office
2. Define the general objective of the project, identify key activities and yearly slogan.
3. Contact possible partners (Astronomy institutes, Observatories, Planetariums) in each country.
4. Contact potential sponsors asking for economical support
5. Build a website and social media
6. Seek volunteers to support the program

Lead:

When: 2023

Location: NA Region

Potential Partners/Funders: OYA

Cost: Med

G1.4 Program: Archeoastronomy in Mexico and the Caribbean

Tasks:

1. Establishing & Contacting existing Archeological, geological, historical, astronomical structures (universities or other) in Mexico and the Caribbean.
2. Setting up a Caribbean Archeoastronomy
3. Stating what is already known and done about archeoastronomy in Mexico and the Caribbean
4. Developing list of unexplored (or partially explored) areas for astronomy artifacts.
5. Public awareness about Archeoastronomy (to limit opposition and misinterpretation)
6. Specific training in Archeoastronomy (stakeholders)
7. Coordinated Exploration program (in each country or region)

Lead:

When: 2024

Location: Mexico; Caribbean

Potential Partners/Funders:

Cost: Med

G1.5 Program: An international TV / FM radio channel to produce original astronomy broadcasts in French, Creole, and Spanish and translate others from NASA, ESA, and other major agencies in the astronomical sector.

Tasks:

1. Location & specific hardware/software selection
2. Geostationary communication satellite service
3. Distance broadcaster opportunity
4. Contacting local national communication authorities
5. International ads protocol (NA-ROAD regions)
6. International staff/translators/technicians/adm (NA-ROAD regions)
7. Possibilities for retransmissions in non-reachable localities
8. Public promotion plan

Lead:

When: 2023

Location: NA Region

Potential Partners/Funders:

Cost: Med

G1.6 Program: Vera Rubin Observatory - Zooniverse projects - OAE, OAO, and OAD communication of opportunity to global audience, through lens of ‘science is a global, team effort’ (note: Zooniverse [sites translated](#) to all languages)

Tasks:

1. Zooniverse is established as the Citizen Science arm for Vera Rubin Observatory.
2. Data pipeline from Rubin Observatory to Zooniverse as well as a user interface to generate Zooniverse projects that engage the public in citizen science with Rubin Observatory data. (done)
3. Support OAE, OAO, and OAD partners to utilize Zooniverse projects in their efforts
4. Create and implement a communication/recruitment plan from Zooniverse to the OAE, OAO, and OAD partners.

Lead: Adler

When: 2023

Location: International

Potential Partners/Funders: OAE; OAO; OAD; Zooniverse

Cost: Med (partially funded through Vera Rubin Observatory and UK council already)

Goal 2: Advance the use of astronomy and astronomy facilities/resources to support economic development in local communities through both astronomy and non-astronomy activities.

Listening is the key first step to implementing this goal - we will engage with communities to prioritize their needs and understand their culture. Goal 2 is at the heart of Astronomy for Development in North America. Supporting economic development in disadvantaged and at-risk communities is to begin to address historic economic inequities from the practice of astronomy. Fostering sustainable economic development for the long-term benefit of economically disadvantaged and racialized, underrepresented communities will enhance all of the other NA-ROAD goals.

It is important to understand the connections between our astronomy facilities and institutes and the local communities. For new and/or continued use of land and resources by astronomical organizations into the future, a fair and equitable relationship must be established where both parties benefit. But this can only be achieved through building meaningful relationships between local communities and the astronomical community. Furthermore, supporting community initiatives and priorities outside of the astronomy community's direct astronomical self-interests can help in expanding our understanding of these communities, building relationships, and identifying innovative economic opportunities.

More broadly, economically challenged communities often face difficulties providing basic needs and services to their residents (clean water, internet, etc.). Astronomical organizations can support diversifying economic opportunities (through jobs, etc.) and provide infrastructure addressing basic needs (e.g., clean water, internet, etc.).

Astrotourism provides one pathway for economic development within disadvantaged and at-risk communities. Astrotourism efforts depend on trust and deep relationships with the local community. They must be culturally sensitive, environmentally responsible, and place the local communities in the lead. Critically, the OAD must ensure that our efforts help to promote the **local** economy, as opposed to being co-opted for the sole benefit of external large corporations. As with other efforts to be carried out under this goal's umbrella, astrotourism also provides an opportunity to address broader access issues within the local community (e.g., access to clean water, broadband internet, etc.). Examples of astrotourism in urban communities could include Science festivals, astro camps, hack-a-thons, STEAM outreach projects, training teachers, entrepreneur camps, and volunteer tourism. These could be done in conjunction with the OAO and OAE.

Initiatives and Programs

G2.1 Program: Astro tourism (Volunteer) - implemented through the community to identify needs and practices. Sustainably implemented. Combine with internet marketing and promotion.

Tasks:

1. Develop inventory of existing initiatives that relate to this goal.
2. Develop a list of potential locations to focus this goal.
3. Identify contacts in communities and offer listening sessions.
4. Develop a webpage and network for the astronomy community to participate in initiatives.
5. Develop metrics for success of any initiative for the communities involved.

Lead:

When: 2022-24

Location: Southwest, Chicago, Baltimore

Potential Partners/Funders: NOIRLab; AURA; AUI; GLAS; Adler; STSCI

Cost: Start small or help an existing project. Low--high

G2.2 Program: Organize artistic festivals nearby or in Astronomy Facilities. E.g., “Blue dot festival” by the Jodrell Bank Discovery Centre and Wild Edibles Festival w/ Green Bank Observatory.

Tasks:

1. Develop inventory of existing initiatives that relate to this goal.
2. Develop a list of potential locations to focus this goal.
3. Identify contacts in communities at astronomical facilities and offer listening sessions.
4. Develop metrics for success of any initiative for the communities involved.

Lead:

When: 2022-23

Location: Southwest, Hawaii, Baltimore-DC, Chicago, West Virginia

Potential Partners/Funders:

Cost: High (Needs more research)

G2.3 Program: Promote free/reduced-cost use of Astronomy Facilities, Planetariums, science museums, etc. by local communities for their work/meetings; free internet

Tasks:

1. Compile list of facilities and facility leadership.
2. Develop protocol for negotiating with facility leadership.
3. Perform needs assessment for communities local to the facilities.

Lead:

When: 2022

Location: All Astronomy Facilities

Potential Partners/Funders: Adler Planetarium, CFHT, Green Bank Observatory, NOIRLab, Large Millimeter Telescope, etc.

Cost: Low

G2.4 Program: Build database of strategies and activities - Implement an “office” or virtual space online where individuals with innovative ideas for products can patent those ideas and/or take them to market (Examples: App, education resource, product, etc.) - resource location and brainstorming space.

Tasks:

1. Build an open source repository, for example using GitHub.
2. Collect a list with relevant information (title, contact info, contact person, direction) of all (or most of) astronomical institutions, observatories, planetariums, and associations (e.g. RASC).
3. Contact the representative of every facility to ask if they already perform such kind of activities and/or if they are interested in doing them.
4. Write a review with the methodology and experiences of those institutions that already are doing these kinds of activities.
5. Share the review with the interested partners.

Lead:

When: 2022

Location: Virtual

Potential Partners/Funders:

Cost: Low

Goal 3: Advance the use of astronomy to facilitate STEM education and outreach, in collaboration with the OAE, OAO, and OAD.

This goal addresses U.N. Sustainable Development [Goal 4](#): Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.

The role of the NA-ROAD with respect to STEM education is to support and enhance the efforts of the IAU Office of Astronomy for Education (OAE), the Office of Astronomy for Outreach (OAO), and the Office of Astronomy for Development (OAD) by focusing on creating new projects or contributing to existing projects in the area of capacity building in underserved and underrepresented communities in need.

The NA-ROAD will fulfill this role through the following activities:

1. Facilitate and maintain strong relationships with and knowledge of OAO and OAE organizations and programs.
2. Identify communities in need and share that information with the OAO and OAE.
3. Facilitate communication between target community leaders and existing programs.
4. Identify and communicate specific unmet needs from target communities and facilitate the communities' access to available resources or the creation of new programs.
5. Continually assess the outcomes of programs on the economic and educational well-being of target communities and communicate those findings.
6. Compile and disseminate best practices and success stories in relationship to existing programs of the OAO and OAE.
7. Identify existing programs within target communities that are currently unrelated to OAO and OAE activities that align with NA-ROAD goals and could benefit from available resources and support.
8. Maintain strong relationships with organizations engaged in setting policy around the use of astronomy for STEM education, including the AAAS Fellows, the Canadian Science Policy Advisors, and others similar programs.

Initiatives and Programs

G3.1 Structural: Learn from the OAE, OAO, and OAD to help define our NA-ROAD role with respect to this goal.

Tasks:

1. Learn from OAE and OAO what the needs are.
2. Ask those offices to help our OAD define our role w/in the umbrella of this goal.
3. Identify how the NA-ROAD will engage w/ the OAE and OAO (e.g., will we have a

Governing Council member attend all OAE and OAO meetings?).

4. July 22 is the meeting of the OAO, OAE, OADs - make this a key part of the agenda.

Lead: AUI/AURA

When: Ongoing

Location:

Potential Partners/Funders: OAE; OAO; OAD; Sloan Foundation; Simons Sandbox.

Cost: Med

G3.2 Program: Support the OAE in establishing National Astronomy Education Coordinators (NAEC) in all NA locations.

Tasks:

1. Create a list of existing NA NAECs.
2. Establish a strategy to contact those without NAEC's in their country/region to understand if there's a need.
3. Help establish NAEC's in regions where there is an interest and need.

Lead: Adler

When: 2023

Location: Initial focus: Caribbean partners w/o NAEC

Potential Partners/Funders: OAE. Puerto Rico NAEC.

Cost: Med

G3.3 Program: Support OAE and OAO in adapting their materials so they are culturally responsive for NA-ROAD target audiences (under-resourced, under-represented, at risk communities, etc.)

Tasks:

1. Learn from OAE, OAO, OAD about their existing efforts around culturally responsive resource development and implementation.
2. Research and understand best practices around culturally responsive resources; support OAE, OAO, and OAD in integrating these practices into their efforts.
3. Ask local astronomy groups for astronomy outreach material needs.
4. Design a protocol to support sustainability of distributed kits for continual activity development and implementation.

Lead:

When: 2022

Location: NA Region

Potential Partners/Funders: OAE, OAO, and OAD, need to identify early prototype locations/programs

Cost: Med

G3.4 Program: Support OAE, OAO, and OAD in sharing opportunities and impact with target audiences.

Tasks:

1. Learn from OAE, OAO, OAD about their existing efforts in sharing opportunities and impact with target audiences.
2. Work with OAE, OAO, OAD to enhance/expand sharing opportunities and impact with target audiences.

Lead:

When: 2023

Location: NA REGION

Potential Partners/Funders: OAE; OAO; OAD; Need to identify early prototype locations/programs

Cost: Med

G3.5 Program: Create communication plans for sharing the impact of OAE, OAO, and OAD efforts and continued areas of need with policy makers.

Tasks:

1. Learn from OAE, OAO, OAD about their existing efforts working with policy makers.
2. Develop relationships with policy makers; grow awareness of OAE, OAO, and OAD efforts among policy makers.
3. Draft communication plans for sharing impact and continued areas of need with policy makers.

Lead:

When: 2022 / 2023

Location: NA REGION

Potential Partners/Funders: OAE; OAO; OAD; AAAS Fellows; Canadian Science Policy Advisors, etc.

Cost: Med

Goal 4: Promote productive employment opportunities and sustained career pathways for adults in astronomy and astronomy adjacent fields.

This goal addresses U.N. Sustainable Development [Goal 8](#): Promote sustained, inclusive, and sustainable economic growth, full and productive employment and decent work for all.

The NA-ROAD can play a crucial role in advocating for and promoting projects, policies, and programs within the region that address increasing the participation of persons from vulnerable communities in astronomy-related trades and careers. Activities should be characterized by:

1. Their alignment with the UN Sustainable Development Goal 8
2. Inclusion of clearly articulated pathways from training to employment
3. Planning that reflects both recruitment and retention of adults in productive employment
4. Actions targeted at increasing the quality of life for individuals and their families
5. Measurable goals to increase participation by under-represented persons/communities in the STEM workforce
6. Inclusion of critical thinking as well as scientific and cultural literacy in program design and implementation
7. Culturally flexible design
8. Well-designed and rigorous assessment
9. Robust dissemination that considers nontraditional methods
10. Clear articulation of target population served, including but not limited to under-represented groups in STEM, Indigenous communities, persons with disabilities, and prison populations

The NA-ROAD is in a unique position to support and promote successful programs, provide a common platform for the dissemination of project results and act as a broker between communities in need and policy makers. The NA-ROAD is also well positioned to serve as a liaison between communities in need, workforce development programs, and employers in astronomy and astronomy-adjacent fields. By engaging in activities that amplify the voices and serve the needs of marginalized communities in the area of training and employment, measurable outcomes can be achieved in the workforce profiles in astronomy and astronomy-adjacent jobs.

Initiatives and Programs

G4.1 Structural: Compile and disseminate information about the employment and career needs and opportunities within astronomy/astronomy-adjacent companies, industry, observatories for the purpose of identifying existing or potential programs that can be supported by the NA-ROAD. As we develop contacts, we will expand this across the NA-ROAD region.

Tasks:

1. Develop a tool (survey, spreadsheet, or form) that can be used to gather information from national labs or equivalent, observatories, industry partners.
2. Compile a list of astronomy and astronomy related jobs/careers and the qualifications employers seek for those positions.
3. Make the results of this effort available to NA-ROAD affiliates and through a web presence.

Lead: GLAS and Adler

When: 2021 and 2022

Location: NA-Region

Potential Partners/Funders: National labs or equivalent, observatories, industry partners

Cost: Low

G4.2 Structural: Compile and disseminate information about existing educational pathways and training programs that align with current job opportunities and identified industry/employer needs.

Tasks:

1. Develop a list of institutions that currently offer astronomy and astronomy-adjacent educational opportunities.
2. Develop a tool (survey, spreadsheet, or form) that can be used to gather information from education and training institutions regarding their programs with an emphasis on opportunities available to underrepresented communities and the demographics of existing programs.
3. Make the results of this effort available to NA-ROAD affiliates and through a web presence.

Lead: GLAS and Adler

When: 2021-2022

Location:

Potential Partners/Funders:

Cost: Med

G4.3 Structural: Identify target programs that can serve to increase enrollment of persons from underrepresented communities in existing astronomy and astronomy-adjacent education programs.

1. Analyze goals 1 and 2 to identify the delivery gaps and opportunities and correlate those findings with the communities that could benefit most readily from efforts focused on

mitigating the gaps and leveraging opportunities.

2. Seek out community leaders in communities of interest that arise from the previous task. Determine where community needs align with projects and programs to meet those needs.
3. Set priorities for addressing the delivery and implementation of services, projects, and programs to increase targeted communities' engagement with education and training in astronomy and astronomy-adjacent opportunities.
4. Identify and pursue partnerships and funding to support priorities.

GC Lead: GLAS and Adler

When: 2022-2023

Location:

Potential Partners/Funders:

Cost: Med

G4.4 Program: Design and pilot test a job training and placement program for observatories. This goal is inspired by the Hawaii Akamai Workforce Initiative observatory training program. Below is only a sampling of the manifold tasks required for accomplishment.

1. Leverage the results of the previous goal outcomes to determine the target for a training program(s), partner institution, and community that could serve as a model for programs across the NA-ROAD.
2. Seek out potential collaborators including observatories, accrediting institutions, etc.
3. Design the training program.
4. Pilot and evaluate the program.
5. Track participants' careers over the next two years.

GC Lead: GLAS and Adler

When: 2022-2024

Location:

Potential Partners/Funders:

Cost: Med

G4.5 Program: Create a program that serves to broker pathways between STEM training programs and job placement.

1. From previous efforts, identify job opportunities across the NA-ROAD region, connect them to graduates of training programs, and support those graduates through the application process (ex the i.c.stars training program [located in a few different urban centers] connected to job placement opportunities within Argonne National Lab, etc.).

GC Lead: GLAS and Adler

When: 2025

Location:

Potential Partners/Funders:

Cost: Med

G4.6 Program: Design and pilot test a job training and placement program target for prison population.

1. Study and seek out partnerships where appropriate with existing prison-to-work programs (e.g., Northwestern University's prison education program and STSci Baltimore prison system project).
2. Compile best practices and disseminate throughout the NA-ROAD affiliates.
3. Determine the model and/or partner that will become the focus of development.
4. Develop a funding and implementation pathway for the project.

GC Lead: GLAS and Adler Planetarium

When: 2024-2025

Location:

Potential Partners/Funders:

Cost: Med

G4.7 Program: Advocate for and provide support for graduate students and postdocs transitioning from academia to non-academic jobs (build on existing efforts by the AAS Committee on Workforce Development).

1. Learn about current efforts being carried about by the AAS Committee on Workforce Development, AAS Committee on Minorities, AAS Committee on Status of Women in Astronomy, the Canadian Astronomical Society, and equivalents across the region.
2. Learn from these professional society working groups and committees if there is a role for NA-ROAD to support and/or advocate for in this effort.
3. Serve as a broker/connector between people working on this across the NA region (e.g., connecting the AAS Committee on Workforce Development with equivalent groups in Mexico, Canada, etc.).

GC Lead:

When: 2022-2025

Location:

Potential Partners/Funders:

Goal 5: Advance the collaboration and sharing of astronomical knowledges to promote connections with and to support the general well-being of Indigenous communities and peoples.

Advancing this goal would support SDGs 1, 3, 6, 8, 9, & 10. The needs of Indigenous communities can range from the most basic like clean water to economic support in the way of quality education.

Historically Indigenous communities have not been included in quality STEM education or new technology. Yet many of our largest astronomical facilities are on Indigenous Peoples' land. There is both a need by the Indigenous populations and an opportunity for the NA-ROAD to take steps towards diversity, equity, and inclusion (DEI) in astronomy. Both economic and educational development is possible. It is worth noting that some of the most economically depressed regions in Canada and the USA are on Indigenous Reserves or Reservations. According to the Assembly of First Nations Fact Sheet 2011 (for Canada).

One in four children in First Nation communities live in poverty. That's almost double the national average. Suicide rates among First Nation youth are five to seven times higher than other young non-Aboriginal Canadians. The life expectancy of First Nation citizens is five to seven years less than other non-Aboriginal Canadians and infant mortality rates are 1.5 times higher among First Nations. Tuberculosis rates among First Nation citizens living on-reserve are 31 times the national average. A First Nation youth is more likely to end up in jail than to graduate high school. First Nation children, on average, receive 22% less funding for child welfare services than other Canadian children. There are almost 600 unresolved cases of missing and murdered Aboriginal women in Canada.

Achieving Goal 5 would start to address vast historic inequities. Even making small steps towards initiating long lasting programs would be significant to these communities.

Short-term or more immediate actions would be to locate and/or develop opportunities to attend or engage in presentations and discussions focused on Indigenous knowledge and Indigenous communities. Building a foundation of community knowledge will help with making contacts and getting permissions to enter communities and start discussions. Contacting local University/College Indigenous affairs offices for resources and additional contacts may help with this as well. Some examples of establishing relationships and trust include:

- Develop Indigenous-community centric star symposium conferences that recognize and pay speakers equitable funds. Include knowledge keepers, Elders as well as Indigenous scientists.
- Contact Pow Wow, indigenous organizations, and gathering organizers to bring small telescopes for sharing and star gazing.

- Facilitate the development of content/activities/textbooks to be produced in the Indigenous language(s). Development of language texts are important to preserve endangered languages and cultures.

Astro tourism/Astro stays (see definition in Goal #2) as a long-term program can be achieved without existing observatories (current programs are only based at existing facilities) and can be based on development needs for the specific communities. NA-ROAD should be sensitive to cultural and sovereignty issues. First, establishing a trusted relationship with a community is fundamental to any forward progress. Programs should be cooperative and environmentally responsible while addressing any basic community needs such as clean water or food sources, and internet and education, for example. Indigenous Communities must have a leadership role and astronomy-supported resources. It is imperative that the stories and knowledge from indigenous culture be incorporated into the program. Additional opportunities may expand to dark sky areas to benefit local communities in a culturally and environmentally respectful way. Furthermore, this program will create more STEM opportunities in education and employment including computing knowledge and database development in addition to creating a tourism funding stream, hospitality training and jobs, and telescope operation and program management jobs.

As a primary example, astronomy has benefited and continues to benefit from the use of Indigenous lands and resources; and oftentimes the Indigenous communities have not benefited in turn. The cultures of Indigenous astronomy, traditional wisdom, and knowledge should be treated with deep respect as an equal and equivalent partner to Traditional Western astronomy.

Initiatives and Programs

G5.1 Structural: Contact local University/College Indigenous affairs offices as well as local Indigenous community centers (e.g., Friendship Centers in Canada) and State/Federal offices for resources and contacts.

Tasks:

1. NA-ROAD introductory email.
2. Develop a culturally appropriate survey to collect ideas.
3. Set up meetings (virtual or in-person) to introduce the NA-ROAD and explore possible collaborations. Example: Working Group for Indigenous Affairs (IWGIA).

Lead: AUI

When: May 2021 through October 2021 (Ongoing)

Location:

Potential Partners/Funders: Current Staff Partners within the NA-ROAD; OAE

Cost: Low

G5.2 Program: Bring telescopes and other resources to pow wows and social gatherings where non-community members are welcome.

Tasks:

1. Make introductions with the local communities and leaders from the Indigenous communities.
2. Introduce the ROAD and the project.
3. Discuss and learn what communities would like to see offered from the ROAD to participate in events.
4. Identify amateur/professional astronomy groups, OAO Telescopes for All program, to secure telescopes for events.

Lead:

When: 2022 - Ongoing

Location:

Potential Partners/Funders: Staff, Amateur Astronomers, Astronomers Without Borders, Astronomical League, OAO, universities, astronomical institutes

Cost: Med

G5.3 Program: Look for the opportunity or develop a forum or context that supports engagement of Indigenous community leaders and scientists (Medium importance)

Tasks:

1. Invite Scientist and Indigenous people communities to the activity.
2. Make sure that the invitation talks about respect for the knowledge that is shareable and the knowledge that is not for sharing.
3. The forum must be on Indigenous land.
4. Write a one-page summary and look for possible funds.

Lead:

When: 2023

Location:

Potential Partners/Funders: NA-ROAD Staff; Cosmovisions of the Pacific.

Cost: High

G5.4 Program: Astro-Tourism.

Tasks:

1. Get in contact with the local communities and leaders from the native communities.
2. Introduce the ROAD and the project.

3. Take decisions about the projects with the leaders from the native communities.
4. Define dates and timeline.
5. Find the volunteers and the telescopes to do the activity.

Lead:

When: 2023

Location: Indigenous Lands

Potential Partners/Funders: Staff, ROAD Partners, Indigenous Communities

Cost: Med - High

G5.5 Program: Support the development of content/activities/textbooks to be produced in the indigenous language(s)

Tasks:

1. Write a One-page summary.
2. Contact local University/College Indigenous affairs offices for resources and contacts.
3. Find the native/professionals (individuals that will work on the translation or production of the resources).

Lead:

When: Ongoing

Location:

Potential Partners/Funders: Staff, Partners

Cost: Med

G5.6 Program: Building networks of small telescopes in collaboration with Indigenous communities. This network can be used for transient follow-up and exoplanet studies and Indigenous-led science.

Tasks:

1. Identify an Indigenous community who is interested in hosting a robotic telescope(s).
Location should have a dry/dark sky.
2. Write a One-page summary.
3. Contact local University/College Indigenous affairs offices for resources and contacts.
4. Find the Indigenous/professionals teachers individuals that will produce the resources.

Lead:

When: 2023/2025

Location: Indigenous Schools

Potential Partners/Funders: Staff, Indigenous Community to volunteer, Partners

Cost: Med