

UH Managed lands – Project Proposal

for projects anticipated to be classified as having “Minimal Impact”

Applicant Name: Smithsonian Astrophysical Observatory (SAO) – Submillimeter Array (SMA)

Project Name: Continuation of **Hungarian Automated Telescope (HAT)** observations

- Brief Description of the Project

(Permanent) Continuation of astronomical exoplanet transit survey observations with two existing automated telescopes (HATs) located on the roof of the SMA hangar.

- Identified Land Use (see HAR § 13-5-22 through 13-5-25)

HAR §13-5-22, P-1 DATA COLLECTION, (B-1) Basic data collection, research, education, and resource evaluation that results in minor disturbance to natural resources or land.

Project is a continuation of efforts initiated in 2002, reauthorized in 2012 and communicated to OCCL (see Appendix A). Located on the roof of the Submillimeter Array (HA-2728, 1994)

- CDUP this proposal alters or affects

HA-2728, 1994. SMA.

- Identify [University of Hawai'i exemption](#) per HAR § 11-200-8(a), if any

Exemption Class #1: Operation, repair or maintenance of existing structures, facilities, equipment or topographical features, involving negligible or no expansion or change of use beyond that previously existing.

1. Operation, repair or maintenance of:

- a. Existing buildings used for offices, classrooms, laboratories, laboratory animals, aquaria, libraries, theaters, student and faculty housing, food service, stores or storage on lands owned, leased or rented by the University.

- Tax Map Key(s): 4-4-15:9 – Mauna Kea Science Reserve (por.)

- Proposed Commencement Date: prior to 2005

- Proposed Completion Date: Permanent (subject to SMA sublease through 2033)

- Estimated Project Cost: \$ N/A

- Total size / area of proposed use:

The two existing HATs are located on the existing platform on the roof of the SMA hangar (Figures 1 & 2). Each HAT enclosure is about 30 x 44 x 30 in.

Project Purpose and Need

- The Hungarian-made Automated Telescope Network (HATNet) Exoplanet Survey is a geographically distributed network of small telescopes optimized for detecting transiting exoplanets.

- To date, more than 60 exoplanets have been discovered. The measurements along with follow up data have been published in more than 30 peer reviewed journal papers.
- Additional exoplanet discoveries are expected to result from continued HAT observations.
- The HATs are fully automated, wide field sky monitors. Each night weather permitting, they take images of one or two fields every 5 minutes and record the brightness of about 10,000 stars in each 10° x 10° field. The measurements detect tiny decreases in brightness when a planet transits in front of a star.
- The two HATs on Maunakea are located on an existing platform on the roof of the SMA hangar (Figures 1 & 2). They operate in conjunction with sister instruments on Mount Hopkins in Arizona. The longitudinal separation between the two sites permits continuous, overlapping observations of the same field for much of each day.
- The exceptional observing conditions on Maunakea are essential to attaining the necessary precision in measuring the brightness changes.
- The HATNet is operated by the SAO in collaboration with PI Gáspár Bakos (Princeton).
- The SMA provides support infrastructure (location, power, network) for the HATs on Maunakea.

Existing Conditions at Project Site(s)

- Geology, Climate, & Hazards

Maunakea is considered an active, post-shield phase volcano (USGS) rising to nearly 13,800 ft. Climate conditions at altitudes of 12,500 ft and above are often below freezing and when combined with humidity above 100% or precipitation, on the surfaces resulting in natural cinder movement from geophysical processes. The project site is the roof of the existing SMA hangar.

- Flora, Fauna, Ecology, Water Resources

None. The project site is the roof of the existing SMA hangar. OMKM performs routine monitoring for invasive species.

- Cultural Resources

The nearest Historic Property is over 900 ft away from the SMA hangar. A comprehensive inventory of the parcel was completed in 2006 and annual routine monitoring continues by OMKM.

- Recreation

None. For safety reasons, access to the roof of the SMA hangar is restricted authorized personnel.

- Built Infrastructure

The two existing HATs are located on an existing platform on the roof of the SMA hangar. The hangar itself is primarily used for maintenance of SMA antennas and ancillary equipment. Other existing equipment on the hangar roof, including cameras and meteorological instruments, has received prior approval.

- Landscaping & Visual Conditions

The HATs cannot be seen from the ground near the SMA hangar. From higher locations, e.g., the ridge near UKIRT, the HATs are visible although they are much smaller than the overall size of the

SMA hangar (Figures 1 & 2). The HAT enclosures are painted white, similar to the color of the SMA hangar roof.

Description of the Project

- Describe the process of completing the project.

The two existing HATs automatically perform astronomical observations every night the weather is suitable. No change in operations is anticipated.

- Location

The two existing HATs are located on an existing platform on the roof of the SMA hangar (Figures 1 & 2). No change in location is anticipated. Each HAT enclosure is about 30 x 44 x 30 in. The enclosures are painted white.

- Who will do the work?

In operation, the HATs are completely automatic. For maintenance or repair, occasional access may be required by SMA staff or visiting scientists.

- Equipment & Transportation

No transport of large equipment is anticipated. Supplies and small parts for repairs, etc., will be transported in SMA light vehicles.

Measures to protect the environment and/or mitigate impacts

- Protective Measures

All project participants will attend an OMKM orientation prior to participating in work on Maunakea.

Use of 4-wheel drive vehicles for travel above Halepōhaku.

Allow OMKM Rangers to visit and monitor activities.

Comply with all actions and measures described in this proposal, including (community) benefits, CMP compliance list, and mitigation measures.

Ensure that loose tools or equipment are not left unattended and are properly stored at the end of each day.

In preparation for high wind conditions (including verification that temporary and permanent infrastructure can sustain 120 mph winds), protocols must include measures to ensure debris and equipment are not blown from the job site.

All improvements shall be designed and installed to withstand the severe weather conditions on the mountain.

Removal and proper disposal of all waste material. All perishable items including food, food wrappers and containers, etc., shall be removed from the site at the end of each day and properly disposed.

Employ invasive species prevention best practices, including inspections of materials by a DLNR approved biologist as appropriate prior to entering UH managed lands.

Motorized equipment, when stationary, must have a drain pan in place suitable for catching fuel or fluid leaks. To allow for expansion with reduced atmospheric pressure, fuel tanks should not be

more than 3/4 full prior to transport to the summit (unless used as the fuel source for transport to the summit).

Large, heavy, or oversized loads must submit notification to the Maunakea Road Conditions listserve at least one day prior to delivery. Loads requiring an escort on public roadways must have this escort accompany them to the final destination. Projects failing to do so must obtain approval from the Maunakea Rangers before arriving at Halepōhaku or may be denied entry to Halepōhaku or above.

Electronic and paper copies of all publications resulting from the work will be provided to OMKM.

Notify OMKM in writing when field activity associated with the project is completed.

The project must be completed within the time frame specified in the proposal and (when applicable) DLNR approval. Projects not completed within this timeframe are not allowed to continue (or commence) without explicit, prior, written approval from OMKM.

- Compliance with Lease, Sublease, or Comprehensive Management Plan (CMP)

During the proposed work, SAO/SMA will comply with all applicable sublease, CMP, and OMKM conditions, policies and procedures.

- Identify other required or associated permits

Installation of the first HAT on the SMA hangar roof was approved on December 3, 2002. Installation of the second HAT was approved after the fact on June 26, 2012 along with authorization to operate both HATs for five years.

- Five Year Outlook

Continuation of HAT operations was included in the SMA Five Year Outlook 2017–2021 that was submitted on December 1, 2016. Previously, this item was listed in the SMA Five Year Outlook 2016–2020, submitted on December 1, 2015. The project was reviewed by Kahu Ku Mauna who indicated additional consultation is not necessary.

Community Benefits

- Benefits to other Maunakea entities and/or global astronomy community

Discovery and characterization of exoplanets is one of the most active topics in contemporary astronomy. HAT discoveries to date have made a significant contribution. Follow up observations of HAT discoveries have been made with telescopes on Maunakea (Keck, Subaru) and elsewhere (HST, Spitzer). Additional exoplanet discoveries are expected to result from continued HAT observations.

- Benefits to the Hawaii Island community

Additional scientific expertise present on the island.

- Will data, publications, or other products be free and available to the public?

HAT measurements along with follow up data are published in peer reviewed journals. The publication list, stellar lightcurves, and other data are available on the project web pages: hatnet.org

For Board Action

DLNR Evaluation Criteria

After approval by the Maunakea Management Board, the Department of Land & Natural Resources or Board of Land & Natural Resources, will evaluate the merits and approve the project based on the following eight criteria (§13-5-30). See <http://dlnr.hawaii.gov/occl/files/2013/08/13-5-2013.pdf>

1. The purpose of the Conservation District is to conserve, protect, and preserve the important natural and cultural resources of the State through appropriate management and use to promote their long-term sustainability and the public health, safety, and welfare. (ref §13-5-1)
How is the proposed land use consistent with the purpose of the conservation district?

The Board of Land and Natural Resources adopted the Comprehensive Management Plan and subplans (Cultural Resources Management Plan, Natural Resources Management Plan, Public Access Plan, and Decommissioning Plan) as the approved management documents for land use and activities in the UH Management Areas. The CMP and subplans provide management strategies designed to preserve and protect the resources located in the UH Management Areas, and the University is committed to their implementation using the resources that are available to it. SMA is also committed to implementation of the CMP, as described in its proposal.

2. How is the proposed use consistent with the objectives of the Resource subzone of the land on which the land use will occur? (§13-5-13. The objective of this subzone is to ensure, with proper management, the sustainable use of the natural resources of those areas. This subzone shall encompass: lands necessary for providing future parkland and lands presently used for national, state, county, or private parks. Land suitable for outdoor recreational uses such as hunting, fishing, hiking, camping, and picnicking. [And other lands not applicable to Maunakea.]

All of the uses that are proposed in this application are within the Conservation District Resource subzone. Astronomy facilities are an identified use in this subzone (HAR §13-5-24(c)) under an approved management plan (Maunakea CMP). In addition to being an identified use, both the University and the SMA are committed to the stewardship of the natural and cultural resources throughout the UH Management Areas in a way that fulfills the objective of the Resource subzone of the Conservation District.

3. Describe how the proposed land use complies with the provisions and guidelines contained in chapter 205A, HRS, entitled "Coastal Zone Management".

This criterion does not apply to the proposed activity. The site of proposed use is over 20 miles from the coast and is not directly hydrologically connected to shoreline resources.

4. Describe how the proposed land use will not cause substantial adverse impact to existing natural resources within the surrounding area, community or region.

The proposed activity is constrained to the roof of an existing building. There will be no change in land use as this is a continuation of existing use. The area is regularly monitored for native and non-native species. SMA will comply with the terms and conditions established in the 2009 Comprehensive Management Plan, as well as conditions imposed by the Kahu Kū Mauna Council, and the Maunakea Management Board.

5. Describe how the proposed land use, including buildings, structures and facilities, is compatible with the locality and surrounding areas, appropriate to the physical conditions and capabilities of the specific parcel or parcels.

The proposed activity is constrained to the roof of an existing observatory building. It will not directly affect the scientific, natural resources, or historic properties in the summit region. No long-term changes to the physical conditions and capabilities of the parcel will occur. The activity is wholly within and consistent with the terms and conditions as identified in the 2009 Comprehensive Management Plan.

6. Describe how the existing physical and environmental aspects of the land, such as natural beauty and open space characteristics, will be preserved or improved upon.

The proposed use is constrained to the roof of an existing observatory building.

7. If applicable, describe how subdivision of land will not be utilized to increase the intensity of land uses in the Conservation District.

Not applicable as no subdivision is involved.

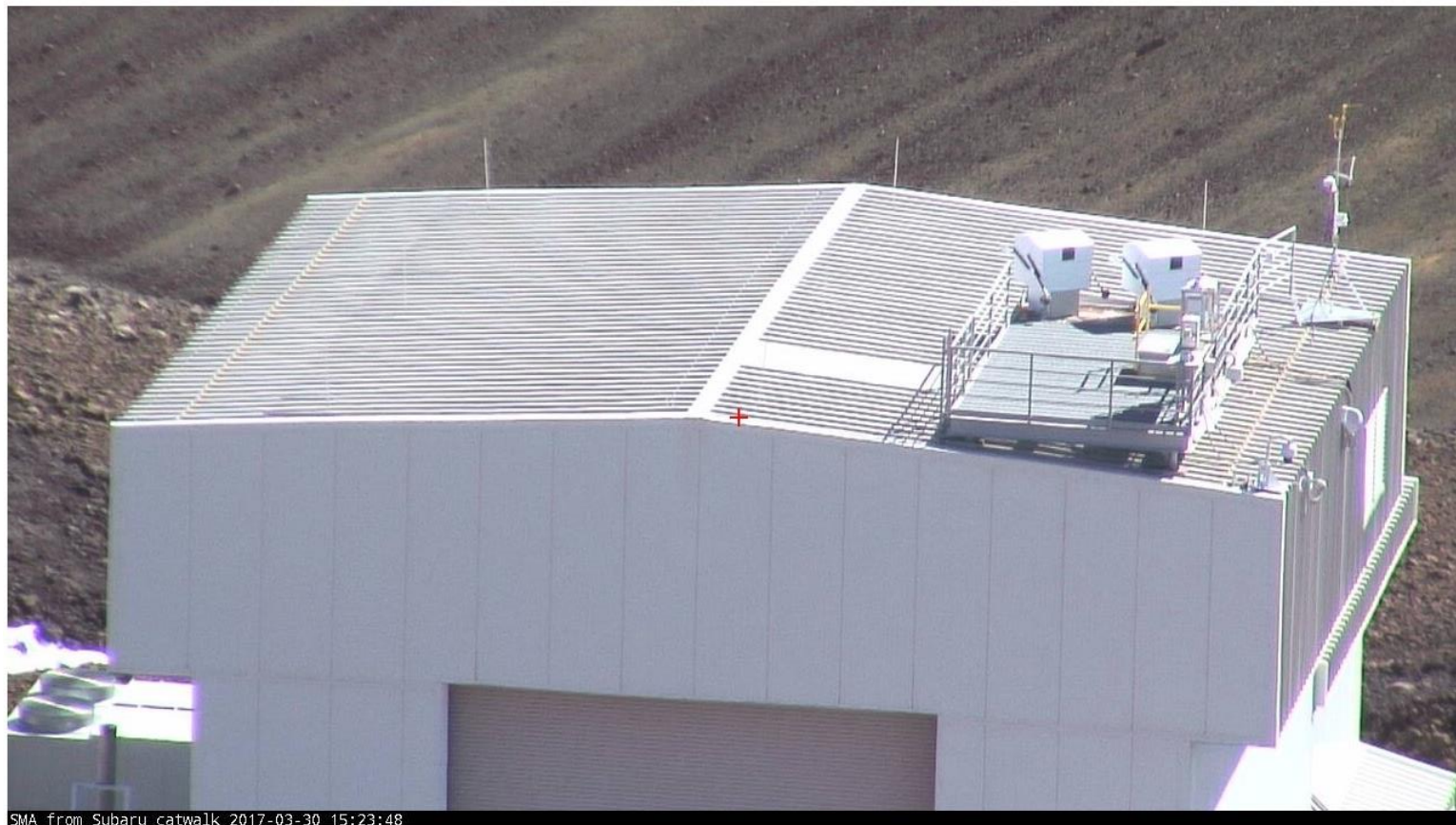
8. Describe how the proposed land use will not be materially detrimental to the public health, safety and welfare.

The proposed activity is constrained to the roof of an existing observatory building. For safety reasons, access to the roof is restricted to properly equipped, authorized personnel. The activity is passive astronomical observing that poses no direct detriment to public health or welfare.

Figure 1. The SMA hangar (center), JCMT (left), and SMA antennas (right) viewed from the Subaru catwalk. The two existing HATs are located on the SW edge of the platform on the roof of the SMA hangar.



Figure 2. Magnified view of the SMA hangar roof from the Subaru catwalk. The two existing HATs are located on the SW edge of the roof platform.



SMA from Subaru catwalk 2017-03-30 15:23:48



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June 26, 2012

Mr. Robert Christensen
Summit Engineer Supervisor
Smithsonian Astrophysical Observatory
645 N. A'ohoku Place
Hilo, Hawai'i 96720

Dear Rob,

Subject: 1. After-the-fact Approval for the Installation of a Second HAT Instrument
2. Installation of Two Additional HAT Instruments and Ancillary Weather Instruments
3. Extension of the HAT Project an Additional Five Years

While reviewing our files it was noted that OMKM did not inform you of the results of the Mauna Kea Management Board's (MKMB) decision to approve your request regarding the HATs project.

This letter is to inform you that on August 9, 2011, the MKMB reviewed and, in consultation with Kahu Kū Mauna, designated the following proposals minimal impact projects: request for an after-the-fact approval to install a second HAT instrument plus two additional HAT instruments on the roof of SMA's summit support facility. The MKMB approved both proposals and authorized SMA to proceed subject to the specifications described in your proposal dated June 4, 2011. In addition, the MKMB also approved SMA's request to extend the entire HAT project an additional five years.

The approval of your requests is subject to the following conditions. SMA is required to:

1. Submit copies of correspondence between the applicant and DLNR.
2. If a DLNR permit is issued submit a copy to OMKM.
3. If applicable, comply with conditions of the DLNR Permit.
4. Notify OMKM when it will commence summit construction activities.
5. Adhere to the mitigation measures described above and in the applicant's proposal.
6. Allow OMKM rangers to visit and monitor installation activities.
7. Notify OMKM upon completion of the project.

Should you have any questions, please do not hesitate to contact me.

Sincerely,

A handwritten signature in cursive script that reads "Stephanie Nagata".

Stephanie Nagata
Director

c: Sam Lemmo, Department of Land and Natural Resources