MEMORANDUM

TO: CFHT Executive, Astronomers, and Observing Assistants

FROM: Pierre Martin, David Woodworth

DATE: 06-02-2000/QSO-010/DRAFT

SUBJECT: The “Two Person Rule” at the Summit: A QSO Perspective

Context

In the framework of the Queued Service Observations (QSO) Project, it appears imperative that the decision making process, leading to the selection of a science program to be carried out, and the execution of these observations must take place in the Waimea observing room. The efficiency and success of the QSO mode depend strongly of the selection and the understanding of the science programs to be undertaken. This process could not be optimized if the observer is working in a difficult environment like the summit, especially for some extended periods as it could be required during QSO observing runs (~15 consecutive nights). In this view, observing from Waimea has always been seen as a fundamental requirement for the implementation of queue observing with the CFH12K and MegaPrime cameras. Starting around March 2001, about 60-70 nights per semester will be scheduled in the QSO mode with CFH12K. On the longer term, this number is likely to go up with MegaPrime. Optimizing efficiency becomes a priority for such a large fraction of the total telescope time at CFHT.

There is, however, a very severe operational constraint to this scenario. Removing the observer from the summit to Waimea leaves the Observing Assistant (OA) alone at the summit during the observing nights. This is a violation of the “two person rule”:

For safety reasons, not less than two persons should be inside the CFHT dome at all time.

The “two person rule” has been reiterated and reinforced following a document prepared by Larry Millard in March 1999. In April 1999, the Working Group in charge of implementing remote observing from Waimea presented a memorandum describing a few plausible options to make QSO remote observing possible with the OA being alone at the summit but operating in a safe environment. Unfortunately, these options so far have not been seriously discussed.

Currently, the only exception to the rule allows the OA to be alone, at the beginning of the night, for a “short time” to carry out the building and telescope checks (See MEMORANDUM dated 16 January 1992 from Peter Sydserff ). In this context, a “short time” is a half-hour to an hour by unwritten policy and current practice.
In this document, we present ideas regarding the implementation of the first option described in the Working Group memorandum, that is, a protocol involving the remote QSO observer, the CFHT OA, and a third party. We believe that such a protocol would provide a safe environment at all times for an OA alone at the summit during remote observations.

**General Comments on the “Two Person Rule”**

In the context of this document, three remarks regarding the “two person rule” are important:

1) *The “two person rule” must strictly be observed for the CFHT daycrew.* This crew is usually involved in activities with higher risks for injuries and taking place in different locations inside the CFHT dome. This is different for the Observing Assistants who spend most of their time in the control or telescope rooms.

2) *We feel that the actual rule does not ensure safety for the OAs at the present time,* especially when the observers are visiting astronomers. The latter are not trained for any urgent assistance at the summit. They are not familiar at all with the different locations inside the dome and generally have no idea how long it can take for an intervention required by the OA in the dome. They are not familiar with the emergency procedures (e.g. phone numbers) and facilities available on Mauna Kea. Also, they might not be comfortable at all with physical injuries to others and might in fact introduce another risky factor during an emergency. In short, we think that the actual “two person rule”, by only assuming that the presence of a second person is sufficient, does not ensure safety at all for the OAs during classical observations at the summit. For classical observing, efforts should be made to better define the rule and actions to be taken. This is, however, beyond the scope of the actual document.

3) *Given current policy, allowing the OA to be alone for “short periods” for relatively safe work, we infer that it is acceptable for an OA to be alone if, within a reasonable period, someone will be along to ensure there has not been an accident that injured the OA.* Again the average visiting astronomer would be response at a minimal level, as stated in number 2 above, unless better procedure and training is given.

**QSO Safety Protocol: Outline**

It is clear that any protocol developed to ensure safety of the OA alone at the summit must be *simple.* In most cases, we can assume that the rapidity of the intervention can be of a crucial importance in responding to an emergency. Only simple, well-defined procedures can ensure an efficient intervention. The protocol must also be *robust,* that is, as many situations as possible might be covered at all time under these simple safety procedures. Probably the best safety prevention is to be aware of the dangers and to be trained to respond to an emergency. So, in establishing such a protocol, *training* is also another key element.

This is the basis of our proposal for solving the “two person rule” at the summit during queue observations. However, our proposal has one severe limitation. *It is only concerned with queued observations carried out by the observatory staff and not remote observations executed by visiting astronomers in Waimea.* Following the importance of training and the familiarity with the actions to take during an emergency, we do not believe that the protocol described below would be sufficient to ensure complete safety of the OA at the summit when visiting astronomers only are at the remote location.
The scenario we propose for discussion is summarized as follows:

**Personnel:**

- There is one Observing Assistant (OA) at the summit in the CFHT dome. This OA is alone (QSO mode) and spend most of his time in the control room.

- There is a CFHT remote observer stationed at the Waimea observing room. The remote observer is a member of the science staff and is only present for QSO observations.

- There are one or two other individuals from another Mauna Kea observatory. One of them is another observing assistant in his dome. His presence is mandatory. This other OA can be alone (queue) or accompanied by visiting astronomers, or in communication with a remote observer from the science staff of this observatory executing queued observations. We will call this (these) person/persons “the third party” for the purpose of this discussion.

**Safety Protocol: Overview**

In the agreement established between CFHT and a third party for providing safety measures to the OA alone at the summit, a detailed protocol will have to be established. This memorandum does not address these details; only an outline of what such a protocol could be and some “safety rules” are described. It must also be noticed that this protocol should be symmetrical between all the parties, that is, the CFHT OA could become the “third party” when the OA of the other observatory is alone at the summit during remote observations, for instance.

1) The safety of the OA at the summit is the responsibility of all individuals involved in the observations, that is, the OA himself, the remote queue observers, and the third party. These individuals must strictly observe the specific rules and procedures described in the complete protocol.

2) In case of an emergency, the OA, the remote queue observer or the third party involved in the safety agreement must intervene immediately (“better safe than sorry”) unless there are other specific instructions from the other authorized individuals directly involved with the emergency situation.

3) The remote observers (when present) play an essential role in ensuring the safety of the CFHT OA (and/or the third party OA). By keeping constant communication with the OA via diverse technological means, they are responsible for keeping an eye on the OA, starting the required emergency procedures when necessary, and act as a coordinating party between the parties during a situation. They are also responsible for informing the CFHT Executive and operation manager.

4) All the Observing Assistants, the Waimea observers, and the personnel involved from another observatory must go through regular training (including drills) and review of the protocol. This includes a maintenance of the diverse technological apparatus involved in the definition of the safety protocol.

**Case Study:**

There are two different operational scenarios possible for a given observing queue observing night at CFHT:
1) *The CFHT OA is alone in the dome with a queue observer in Waimea and the third party OA is in his dome with visiting observers.*

In this case, if the third party OA has to respond to an emergency, the procedures should be very specific about leaving a visiting astronomer alone in the control room at the summit.

2) *The CFHT OA and the second OA are both alone in their dome and two queue observers are at their respective remote locations.*

In this case, both remote observers must remain in communication in case of an emergency.

*Some Specific Safety Rules:*

*It is clear that while the safety protocol is designed to be simple and robust, the complexity might reside in the details.* Discussions will have to be undertaken between the different parties to precisely define the safety rules. However, we offer here some suggestions that could represent a basis for this discussion.

1. When work is required, in a location other than the summit control room (e.g. telescope room, basement, computers, catwalk), the OA must take the following actions: *a)* Inform the remote observer of the action required; *b)* Specify where he/she will be during that time; *c)* Specify how long it will take before he/she comes back to the control room.

2. The OA should always carry a cellular phone with him during his/her work. This phone should be programmed with easily accessible numbers, including 911, the remote observing room number and the third party number. Other easily portable technology (i.e. helmet cameras) could also be a major asset.

3. During this action period, the remote observer must remain attentive at all time and stay inside the remote observing room. If the OA does not come back when he/she was supposed to be back, the remote observer must intervene by first calling the OA cellular phone. If a problem arises, the remote observer must immediately contact the third party and ask him/her to look after the OA. Preferably, the intervening individual will also be reachable by his own cellular phone in case he/she needs instructions from the remote observer during his response to the situation.

4. If the remote observer must leave the remote room for a period of time (must be less than 15 minutes, and not too distant), the OA must *strictly* remain in the control room during that time. The remote observer must also have a cellular phone on him in case he/she is needed back in the remote room in the case of a problem necessitating the intervention of the OA in another location, other than the control room.

5. If one of the OA is accompanied by only one visiting astronomer at the summit, and has to intervene during an emergency by leaving the CFHT dome, this visiting astronomer is not allowed to leave the control room at any time. He/she must remain in communication by video conference or other means with the remote observer. If the OA cannot come back to the dome to finish the night in a reasonable delay, the actions must be coordinated between the remote observer, the CFHT Executive and the CFHT operation manager.

6. During the transition between HP and the summit, the OA must make sure that somebody is informed of
his/her intentions to go up, or down. At dusk, the observer (or queue coordinator) must be present in the
remote room if the OA is making the preparations at the summit for the night and he/she is alone. At dawn,
the remote observer must wait for the OA to be back at HP before leaving his station in Waimea.

7. The videoconference system must be running at all times and the camera pointing at the respective control
rooms (no paper in front of it, etc). The level of the ambient music/noise must be kept at a respectable level
and should not interfere with an intervention in case of emergency. In case the videoconference is not
available due to a failure prior to an observing night, observations must be performed at the summit by the
queue observer.

8. If the OA must go down in case of bad weather, he/she must inform the remote observer and the third party
personnel of the situation, and communicate with them again upon arrival at HP.

9. The OA and the third party must always be at the summit at the same time. In case of evacuation due to bad
weather, both should stay in communication and inform the remote observer(s) of their intentions.

10. All remote observers must be carefully trained in all these procedures so that they can respond quickly and
efficiently in case of an emergency. An emergency situation always has top priority over the observations.
It is also the responsibility of the remote observer to inform the CFHT Executive about any emergency in
the briefest time possible. In case of concerns about the equipment during such an emergency (e.g. shutting
the dome in case of fog), the coordination of these efforts must be done with the CFHT operations manager.

**Other Remarks**

Naturally, the above cases could expand to include the participation of more than one other facility. It would be
ideal if, at some point in the future, all the Mauna Kea Observatory community could lend this type of support
to other telescopes on the mountain.

It seems sure we will all face these same issues as remote and queue observing become the norm. In addition,
current technology items such as helmet cams, wearable personal O2 systems, health alert devices, dome to dome
intercoms, dead man switches, etc. could be employed to increase safety and ease of monitoring of personnel
working alone. Obviously, the closer the cooperating domes are to each other the better, but given the distance
to any dome on the mountain, any would be a suitable choice.