Status Report
SubarU Users Meeting

- Instrument & Facility Development
- MSE Update
- Strategic Outreach – New Programs
- Building Community Bridges & Outlook

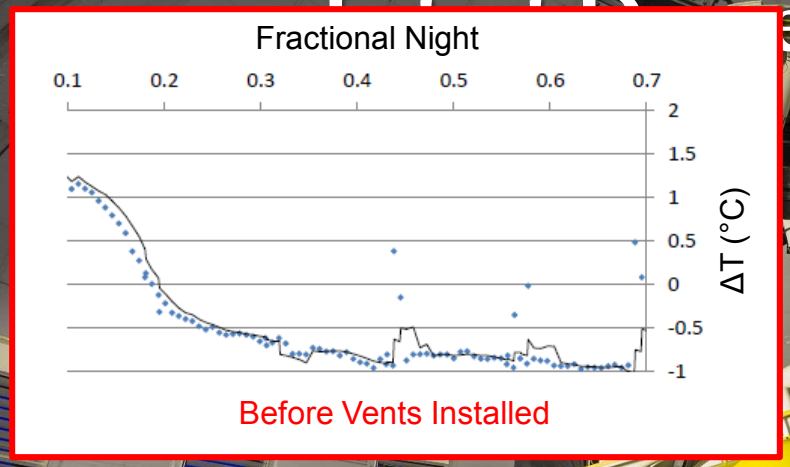
leeting held in Nice, France

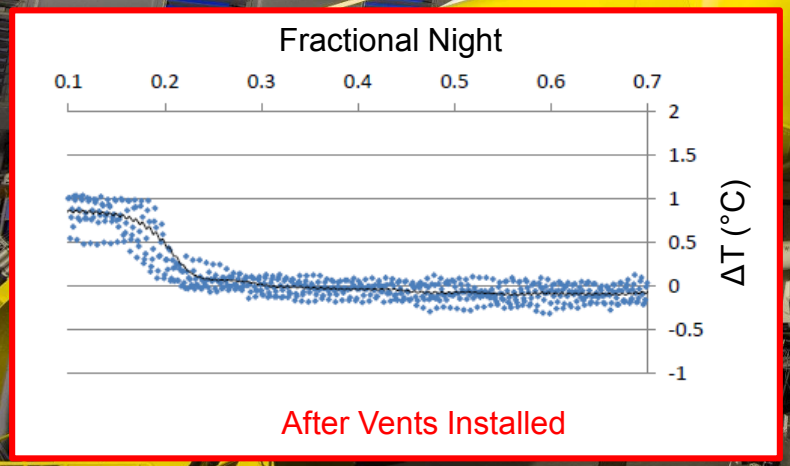
- MSE
- Future of Maunakea

- Followed by various impo
  including SPIRou, LUAU,

Instrument and Facility Development Activity

Venting Results

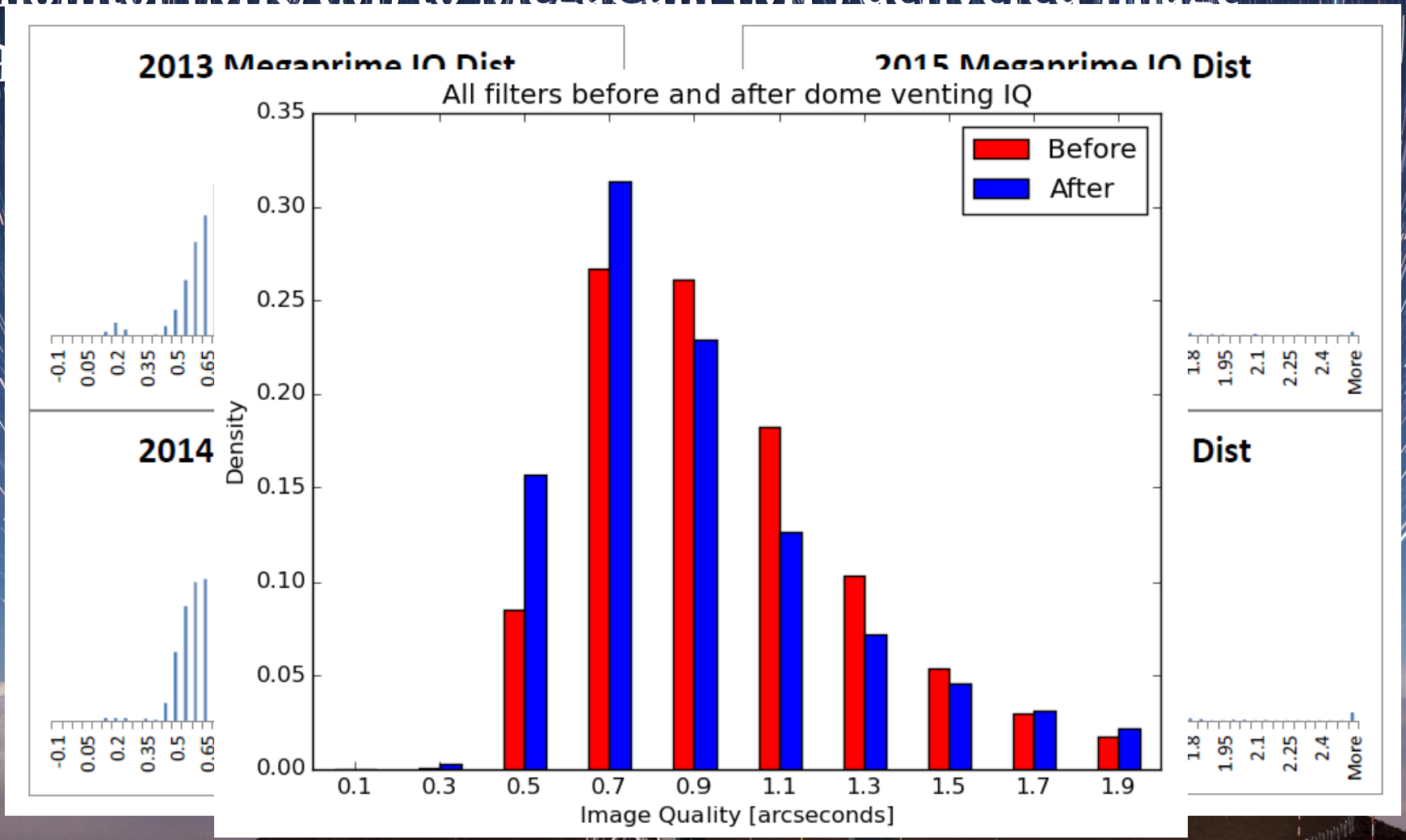




Temperature gauges

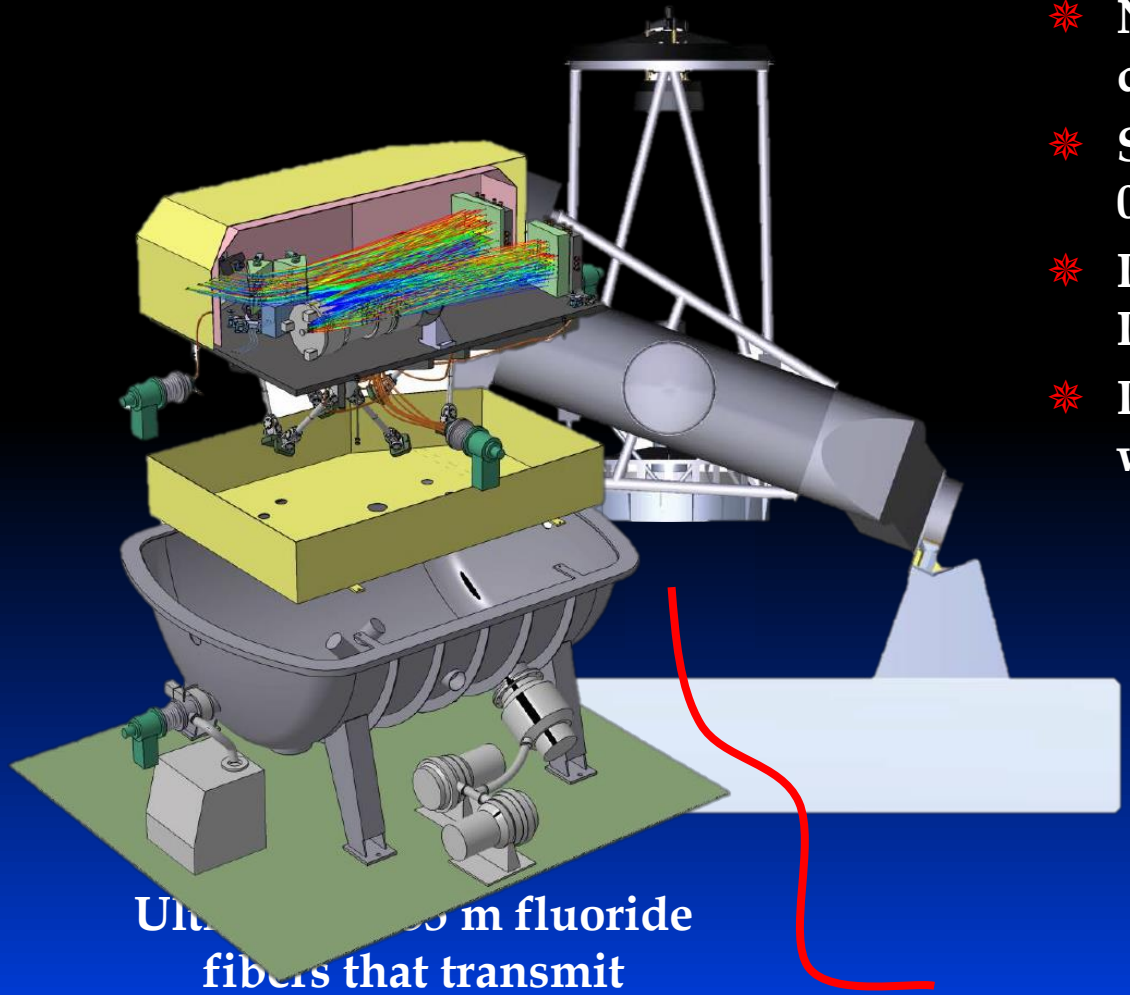
Temperature (Top end ring) – Temperature (Mirror Cell)

Comparing seeing measured with the external seeing monitor (MKAM) to MegaCam (MP) delivered image q



No question that CFHT's dome vents have significantly improved delivered image quality

SPIRou

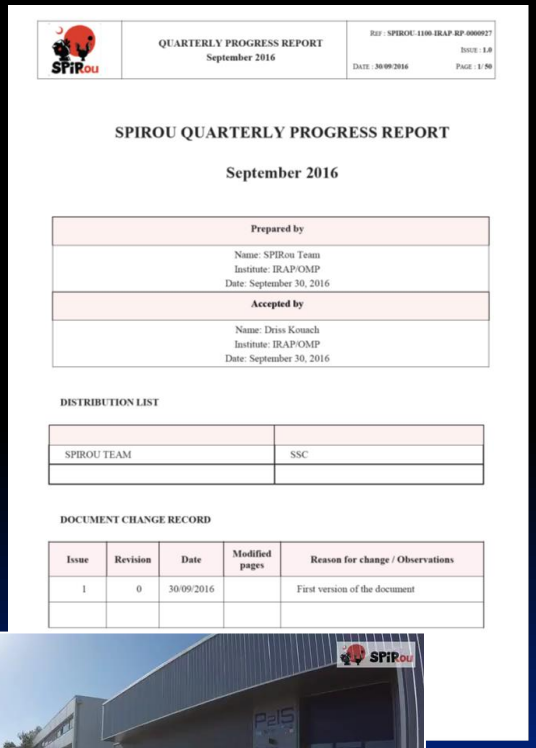


Ult[illegible] m fluoride fibers that transmit through 2.5 µm

- NIR high-res fiber-fed X-dispersed spectrometer
- Single-shot spectral domain 0.98-2.4 µm (YJHK)
- Resolution ~70k with ~1 m/s RV stability
- Polarization measurements with <1% channel cross-talk

SPIRou – Top Level Status

- The latest status report from the SPIRou team lists good progress on multiple fronts with building this instrument
- Spectrometer bench is now at IRAP, along with a number of subassemblies
- Detectors are on order from Teledyne and Focal Plane Assemblies are being manufactured at GL Scientific
- Key tests of the cold opto-mechanical assembly are pending, which will yield considerable information



QUARTERLY PROGRESS REPORT
September 2016

Ref : SPIROU-1100-IRAP-RP-0000927
Issue : 1.0
Date : 30/09/2016
Page : 1/ 50

SPIROU QUARTERLY PROGRESS REPORT

September 2016

Prepared by
Name: SPIRou Team Institute: IRAP/OMP Date: September 30, 2016
Accepted by
Name: Driss Kouach Institute: IRAP/OMP Date: September 30, 2016

DISTRIBUTION LIST

SPIROU TEAM	SSC

DOCUMENT CHANGE RECORD

Issue	Revision	Date	Modified pages	Reason for change / Observations
1	0	30/09/2016		First version of the document

SPIRou Arriving at IRAP

Parts and Subassemblies…

- Good progress made on many jacket fronts with SPIRou with critical path likely set by H4RG science detector procurement
- Collaborative procurement for H4RG detector sets between CFHT (SPIRou) and UdeM (NIRPS) is reducing costs
  - Nominally expect science grade detector around the end of 2017
- First full cold tests early 201[illegible] delivery to Hawaii nominally 2018

H4RG e-grade

Cassegrain unit in cold chamber

MSE Update

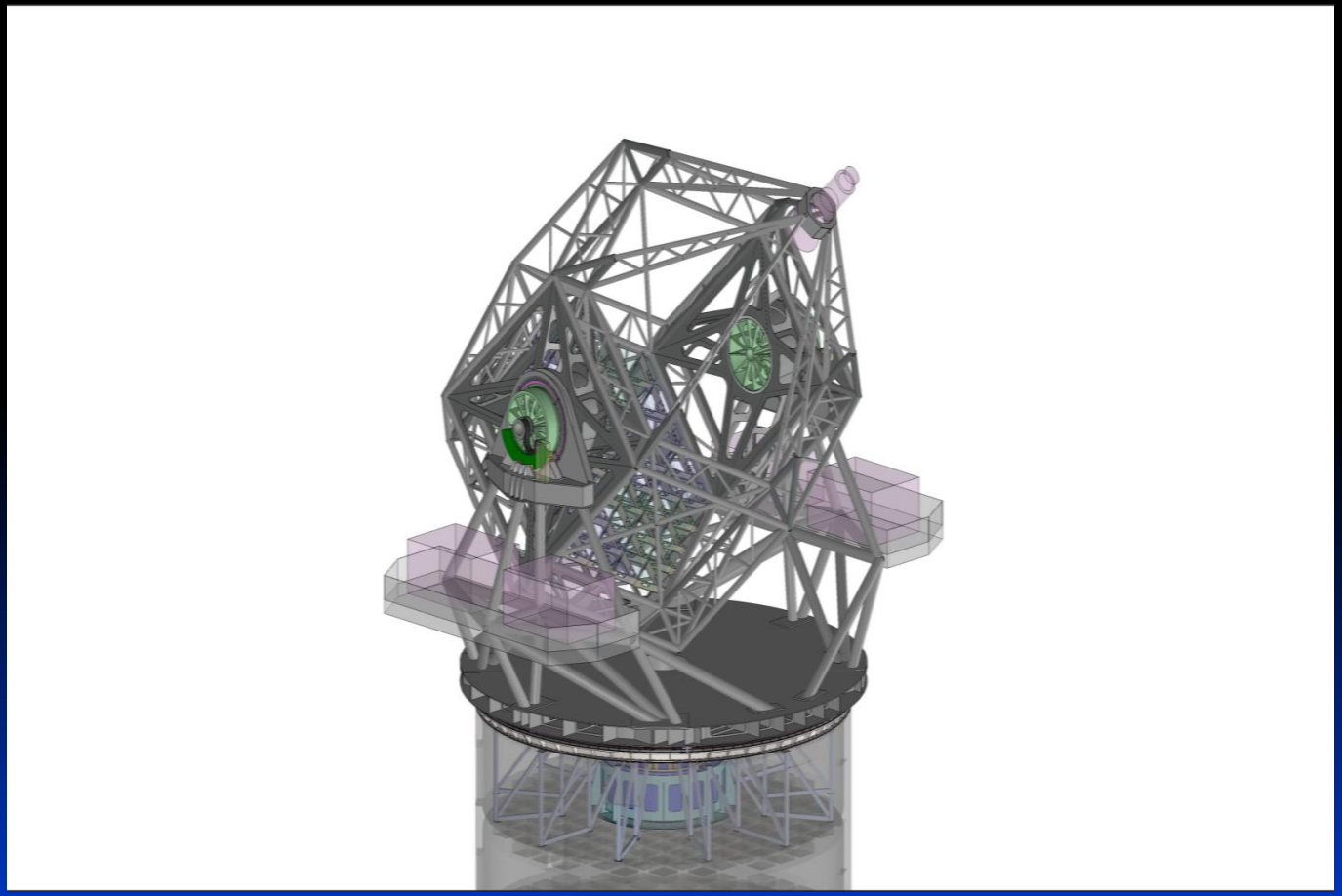
Maunakea Spectroscopic Explorer

MSE Progress on Many Fronts

Two more important MSE international meetings over the past year…

Maunakea Spectroscopic Explorer

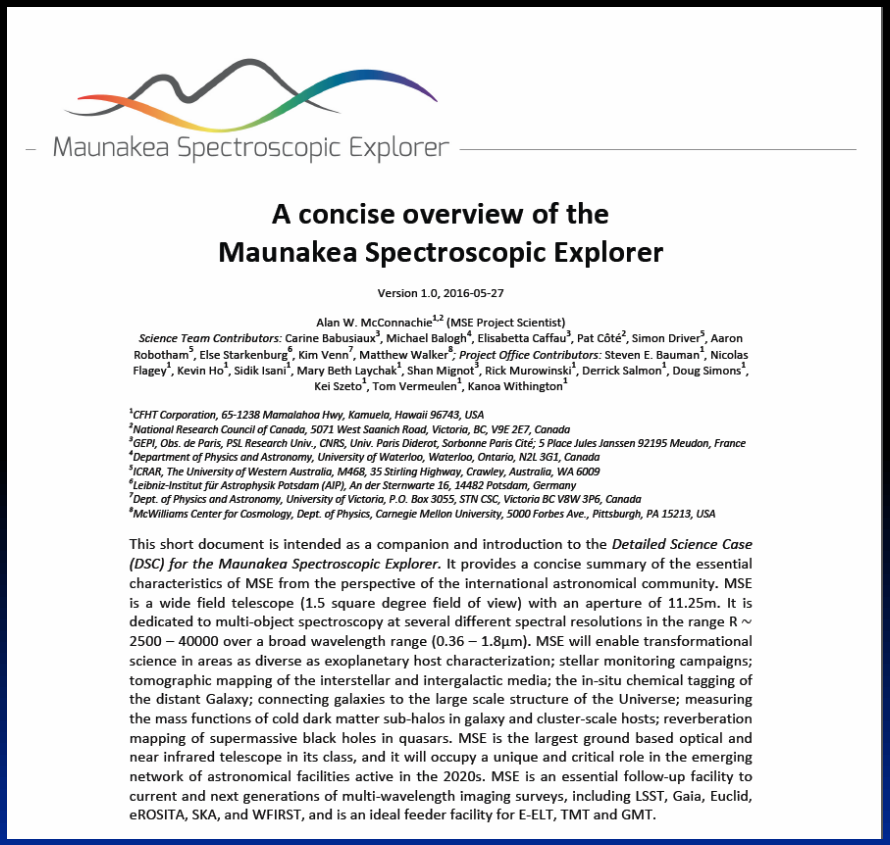
MSE Progress on Many Fronts



Current MSE Baseline Design

Maunakea Spectroscopic Explorer

MSE Science Case Documentation



Maunakea Spectroscopic Explorer

A concise overview of the Maunakea Spectroscopic Explorer

Version 1.0, 2016-05-27

Alan W. McConnachie[1,2] (MSE Project Scientist)
Science Team Contributors: Carine Babusiaux[3], Michael Balogh[4], Elisabetta Caffau[3], Pat Côté[2], Simon Driver[5], Aaron Robotham[5], Else Starkenburg[6], Kim Venn[7], Matthew Walker[8]; *Project Office Contributors:* Steven E. Bauman[1], Nicolas Flagey[1], Kevin Ho[1], Sidik Isani[1], Mary Beth Laychak[1], Shan Mignot[1], Rick Murowinski[1], Derrick Salmon[1], Doug Simons[1], Kei Szeto[1], Tom Vermeulen[1], Kanoa Withington[1]

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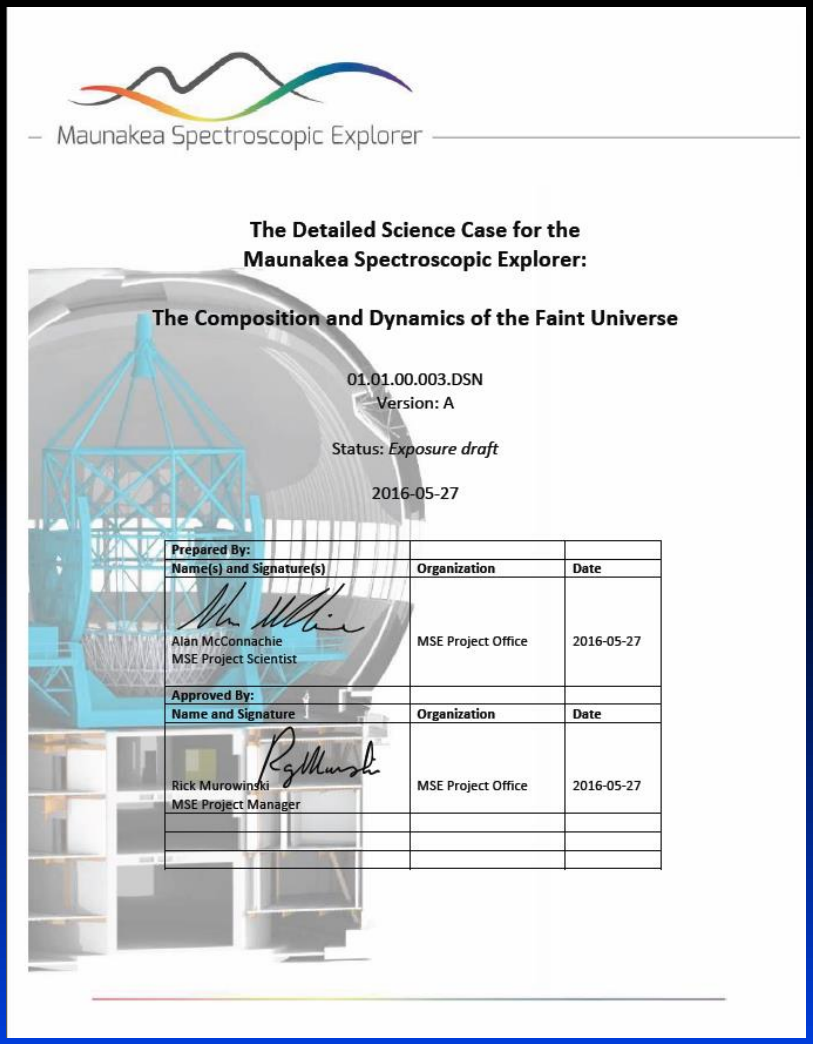
[7]*Dept. of Physics and Astronomy, University of Victoria, P.O. Box 3055, STN CSC, Victoria BC V8W 3P6, Canada*
[8]*McWilliams Center for Cosmology, Dept. of Physics, Carnegie Mellon University, 5000 Forbes Ave., Pittsburgh, PA 15213, USA*

This short document is intended as a companion and introduction to the *Detailed Science Case (DSC) for the Maunakea Spectroscopic Explorer*. It provides a concise summary of the essential characteristics of MSE from the perspective of the international astronomical community. MSE is a wide field telescope (1.5 square degree field of view) with an aperture of 11.25m. It is dedicated to multi-object spectroscopy at several different spectral resolutions in the range R ~ 2500 – 40000 over a broad wavelength range (0.36 – 1.8μm). MSE will enable transformational science in areas as diverse as exoplanetary host characterization; stellar monitoring campaigns; tomographic mapping of the interstellar and intergalactic media; the in-situ chemical tagging of the distant Galaxy; connecting galaxies to the large scale structure of the Universe; measuring the mass functions of cold dark matter sub-halos in galaxy and cluster-scale hosts; reverberation mapping of supermassive black holes in quasars. MSE is the largest ground based optical and near infrared telescope in its class, and it will occupy a unique and critical role in the emerging network of astronomical facilities active in the 2020s. MSE is an essential follow-up facility to current and next generations of multi-wavelength imaging surveys, including LSST, Gaia, Euclid, eROSITA, SKA, and WFIRST, and is an ideal feeder facility for E-ELT, TMT and GMT.

10 pages

Available: http://mse.cfht.hawaii.edu/docs/



Maunakea Spectroscopic Explorer

The Detailed Science Case for the Maunakea Spectroscopic Explorer:

The Composition and Dynamics of the Faint Universe

01.01.00.003.DSN
Version: A

Status: *Exposure draft*

2016-05-27

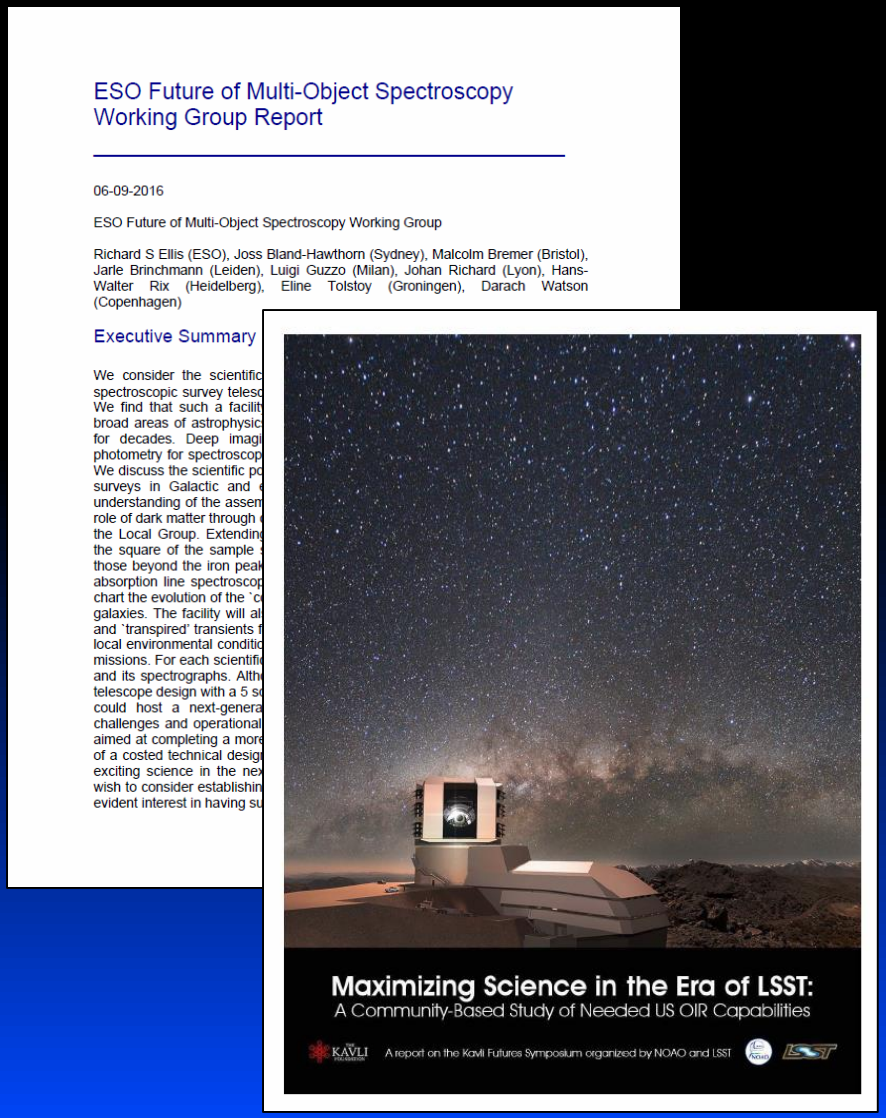
Prepared By:		
Name(s) and Signature(s)	**Organization**	**Date**
Alan McConnachie MSE Project Scientist	MSE Project Office	2016-05-27
Approved By:		
Name and Signature	**Organization**	**Date**
Rick Murowinski MSE Project Manager	MSE Project Office	2016-05-27

210 pages

Maunakea Spectroscopic Explorer

MSE Gaining Attention

- A number of organizations are assessing science goals in the era of LSST and ELT's in the next decade and coming to similar conclusions – *the need for facilities dedicated to large scale multi-object spectroscopy is clear*
  - ESO tasked a working group (led by Richard Ellis) to research options
  - In the US, Kavli commissioned a report that will no doubt feed into the US 2020 Decadal Survey
- MSE is called out in both reports, noting the quality of MSE's science case and relatively advanced state of design/planning
- The MSE Project Office will continue to engage these initiatives to explore opportunities of mutual benefit



ESO Future of Multi-Object Spectroscopy Working Group Report

06-09-2016

ESO Future of Multi-Object Spectroscopy Working Group

Richard S Ellis (ESO), Joss Bland-Hawthorn (Sydney), Malcolm Bremer (Bristol), Jarle Brinchmann (Leiden), Luigi Guzzo (Milan), Johan Richard (Lyon), Hans-Walter Rix (Heidelberg), Eline Tolstoy (Groningen), Darach Watson (Copenhagen)

Executive Summary

We consider the scientific
spectroscopic survey telesc
We find that such a facilit
broad areas of astrophysic
for decades. Deep imagi
photometry for spectroscop
We discuss the scientific pc
surveys in Galactic and e
understanding of the assen
role of dark matter through
the Local Group. Extendin
the square of the sample
those beyond the iron peak
absorption line spectroscop
chart the evolution of the 'c
galaxies. The facility will al
and 'transpired' transients f
local environmental conditic
missions. For each scientific
and its spectrographs. Alth
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could host a next-genera
challenges and operational
aimed at completing a more
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exciting science in the nex
wish to consider establishin
evident interest in having su

Maunakea Spectroscopic Explorer

Programmatics

- Realistically ~1.5 years from completion of Construction Proposal, including external review
  - Large amount of contracted design work underway, leading to several important CoDRs in first half of 2017
- Cost vs. capability trade among the largest and most complex challenges ahead
  - Costs skyrocket with choices in spectrographs
    - High Resolution
    - Near Infrared

- *Funding in uncertain climate remains largest risk to MSE*
- MSE permitting non-trivial but process simpler than TMT's since CFHT operates under a CDUP (granted ~40 years ago) and approach is to structure MSE as an upgrade to an existing facility, not a new facility on a new site
- MSE requires a new Master Lease
  - Will wait until Master Lease is renewed before seeking DLNR approval

Strategic Outreach – New Programs

MAUNAKEA OBSERVATORIES

Community Engagement

- **Build from our extensive outreach base already in place but increase our visibility**
- **Invert our paradigm – increase direct community access to the observatories**
  - **Pleasantly surprise people in the process**
  - ***Give community a sense of ownership in the Maunakea Observatories through personal experiences with the observatories (lower numbers, higher impact)***
- **Open entirely new dimensions to community engagement**
- **Emphasize give-back for long standing support of astronomy**
- ***With all of this in mind, we have been very busy since the last Subaru Users Meeting…***

Putting a Spotlight on Positive Messages

MAUNAKEA OBSERVATORIES

MAUNAKEA OBSERVATORIES

KAMA'AINA OBSERVATORY EXPERIENCE

Summit Tours, Cultural and Environment Education

MAUNAKEA SCHOLARS

Legislative Engagement

Hawaii State Capitol

Rich Matsuda
Keck Observatory

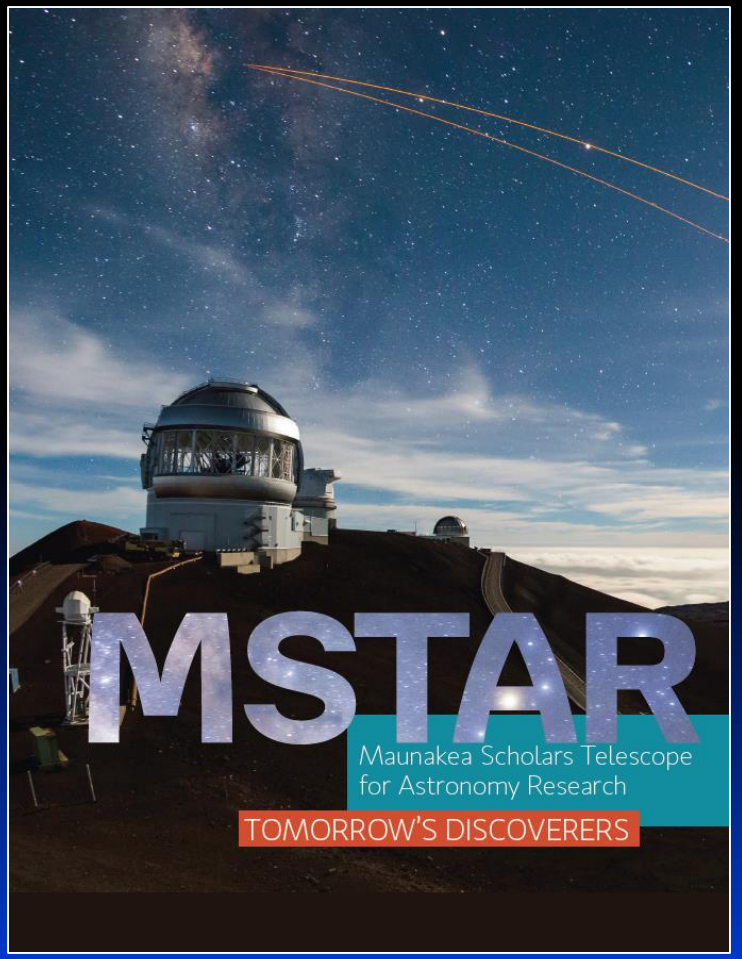
Subaru

EnVision Maunakea

www.envisionmaunakea.org

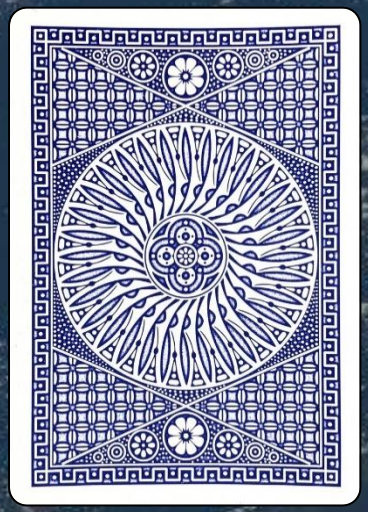
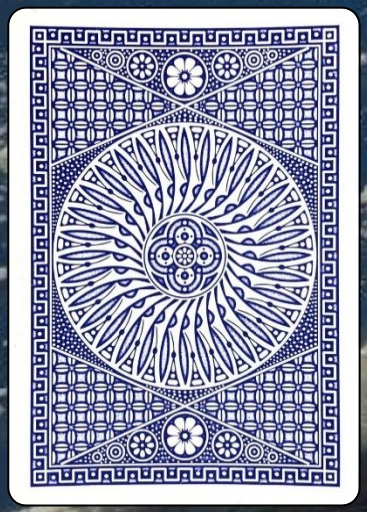
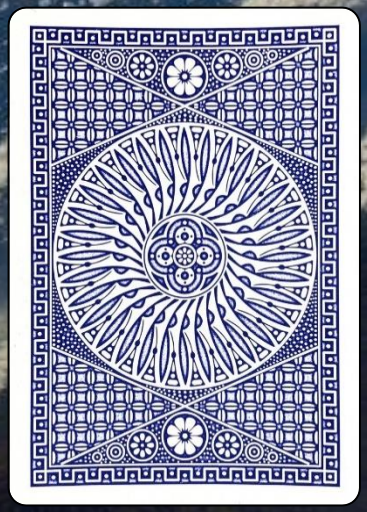
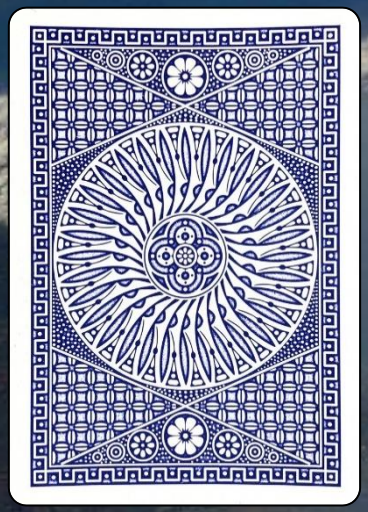
Building Out New Programs

Funds promotion of cultural, environmental, and scientific interests in Maunakea



Part of expansion of Maunakea Scholar Program

In 2017…

In 2015…


Hawaii Tribune Herald

PROTESTERS ARRESTED


Hawaii Tribune Herald

"Science and money do not supersede the sanctity of our mountain."

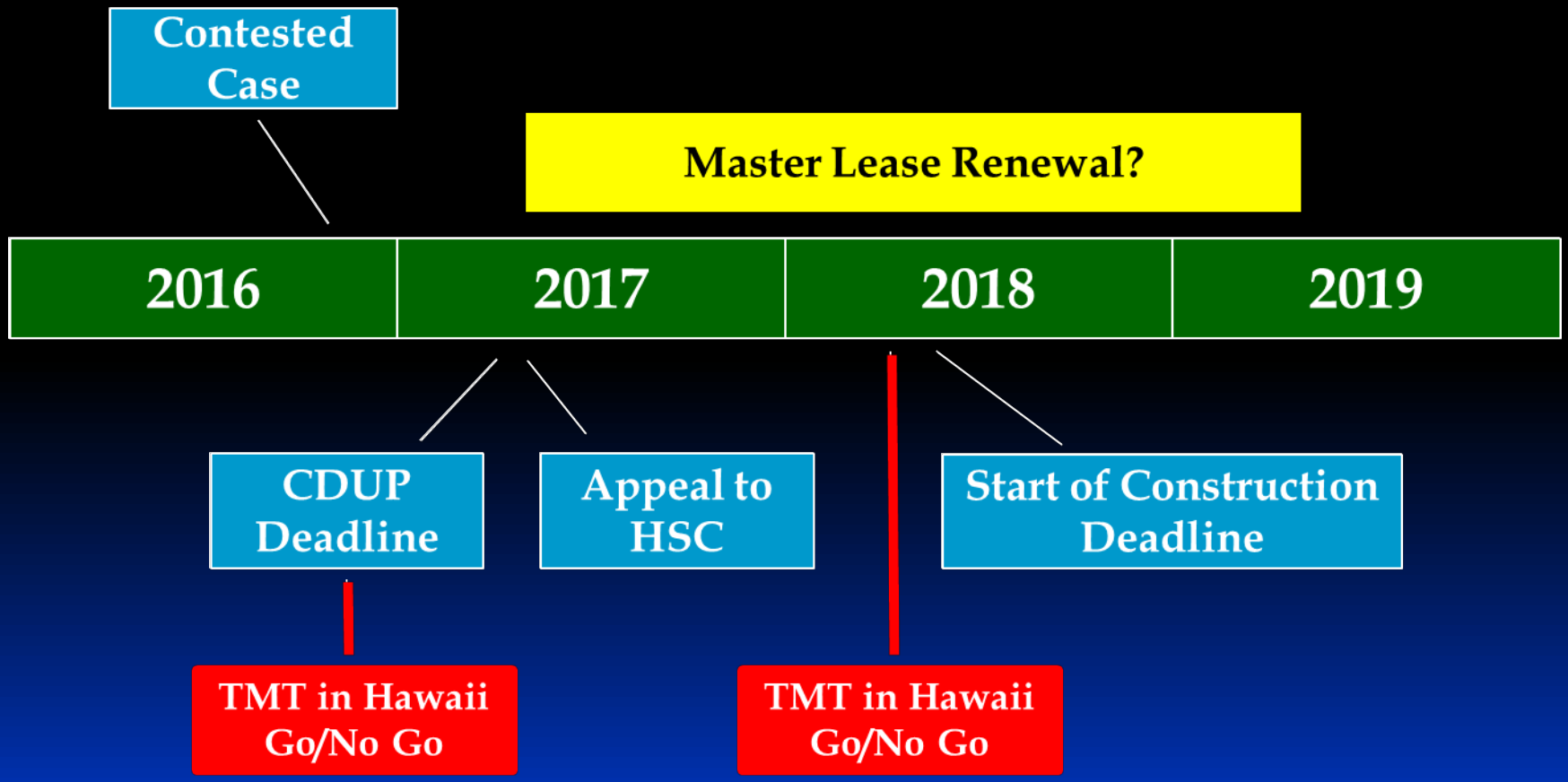
Plan floated for giant composter

Yearly operating costs estimated at $X million

Hundreds turn out to oppose TMT

UH Board of Regents listens to testimony

Timeline Prognostication



Things to Watch in Maunakea Conflict

- **Once the contested case process is completed, anticipate UH restarting the Master Lease renewal**
  - *This would start with the EIS process, perhaps as soon as mid 2017*
- **Regardless of the TMT outcome, the Master Lease renewal is a <u>different conversation</u> –**
  - **Cannot prevent a master lease renewal with a road block**
  - **>1000 families today work in Hawaii astronomy, most on the Big Island, with thousands more people positively connected with the Maunakea Observatories over their ~50 year lifetime**
    - **In contrast, TMT has little-to-no presence in Hawaii**
    - **Easier to villainize an "outsider" based on the mainland than MKOs with staffs deeply connected to the community**

Things to Watch in Maunakea Conflict

- **Last month a Hawaii court ruled verbally that the Land Board should have held a contested case before it approved TMT's sublease**
  - **TMT needs both a building permit (CDUP) and sublease to enable construction**

Hawaii Tribune Herald

Friday, December 16, 2016 | Proudly serving Hilo and the Big Island since 1923 | 75 cents

Another setback for TMT

Hilo Circuit Court judge overturns state Land Board's approval of sublease

Courtesy of TMT INTERNATIONAL OBSERVATORY

An artist's rendition of the Thirty Meter Telescope on Mauna Kea.

By TOM CALLIS
Hawaii Tribune-Herald

A Hilo Circuit Court judge on Thursday overturned the state's approval of the Thirty Meter Telescope's sublease for Mauna Kea.

The Native Hawaiian Legal Corp., which was representing plaintiff E. Kalani Flores, said Judge Greg Nakamura ruled the state Board of Land and Natural Resources violated their client's constitutional rights for rejecting his request for a contested case hearing before it consented to the agreement in 2014.

The sublease is between TMT International Observatory and the University of Hawaii at Hilo, which holds a master lease for much of the mountain. At the time, the Land Board said the decision was a matter of internal management, not subject to the quasi-judicial hearings.

"To me, it confirms that

ISHIKAWA

MEISENZAHL

Native Hawaiian cultural practices have a right to be involved in these agency decisions," said NHLC attorney David Kopper. "And their interests are no less important than other commercial interests."

TIO needs the Land Board's consent on a sublease and land use permit to resume building its telescope on Mauna Kea.

See SETBACK Page A10

- **If upheld this has potential impact on Land Board granted leases and subleases all over the state of Hawaii so this has ramifications beyond TMT**
- ***Last Friday the final ruling was released, vacating the Land Board's consent to the sublease, sending the matter back to the Land Board to get resolved***
- ***State of Hawaii will appeal this ruling – getting it resolved on timescales consistent with TMT's need is a concern***

Mahalo Nui

- The TMT conflict is increasingly being played out on a legal "theatre", with the contested case process ongoing for the Conservation District Use Permit and the possibility of another Contested Case being needed for their sublease
- Key milestones are approaching that will critically inform TMT's site decision
- With an eye toward the long term future of Hawaii astronomy, where the Maunakea Observatories can have the most impact is on the Master Lease renewal process
- Though we have plenty of "white water" ahead, I remain optimistic about the future of Hawaii astronomy

CFH

Maunakea Spectroscopic Explorer