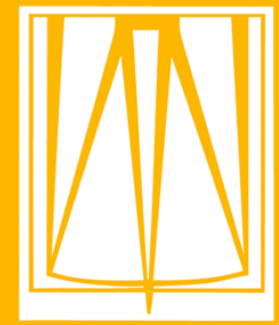




**GEMINI**  
**OBSERVATORY**



*Exploring the Universe, Sharing its Wonders*

# Lessons learned from Gemini observations of Didymos mutual events in 2017



Joanna Thomas-Osip

Gemini Science User Support Department

# Many ways to get time for the many ways we do research!



	Regular Programs	Large & Long Programs	Fast Turnaround	Director's Discretionary Time	Poor Weather
When	Once per <b>semester</b>	Once per <b>year</b>	Once per <b>month</b>	Anytime	Anytime
Review	National Allocation Committees	LLP Time Allocation Committee	Other proposers! ( <b>No TAC</b> )	<b>Chief Scientist</b>	<b>Head of Science Operation</b>
What for?	Routine programs	<b>Large</b> allocation and/or <b>multi-semester</b>	<b>Immediate, short</b> and/or <b>follow-up</b>	<b>Special opportunities</b>	Bright targets
Observing mode	Queue, Classical, Priority Visitor	Priority Visitor (Queue occasionally)	Queue	Queue, Priority Visitor	Queue



65%



20%



10%



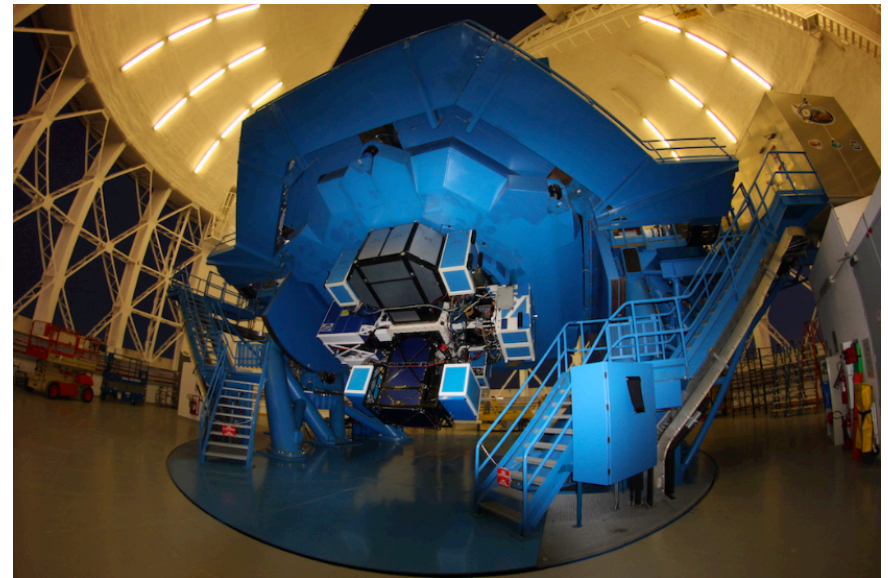
5%



Weather loss

## “regular” projects

- Submitted during the **Calls for Proposals** (CfP):  
in *October* (A semester) and *March* (B semester)
- Programs lifetime is **6 months**:  
Feb-Jul for A semester and Aug-Jan for B semester
- Full access to all capabilities
- Classical or Queue
- **Oversubscription ~2 for US**



## LLP: projects that require 100s of hours and/or several semesters

- One proposal and you're done except for progress reports
- Letter of intent required in **February**, and proposal submitted with the **B semester CfP**
- Can stay active for up to **3 years!**
- **Oversubscription ~5 at first but has dropped to ~2**  
24 publications so far since 2015 on:

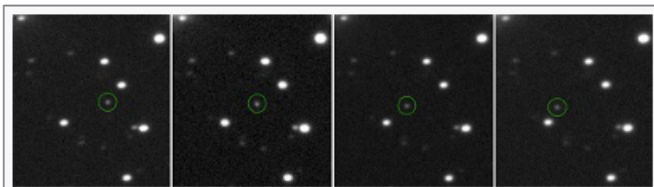


Figure 6. Sequence of four Gemini images of near-Earth asteroid 2014 EN45 (circled). This object was discovered by the NEOWISE survey on 6 March 2014 and imaged by GMOS-S on 13 March 2014, which provided critical astrometry needed to confirm the asteroid's orbit. 2014 EN45 is ~800 meters in diameter and is as dark as a piece of coal.

Exoplanets

Lensed galaxies

Asteroids

Low-mass galaxy evolution

Kuiper Belt objects

Faint Halo objects

Supernovae

Quasars

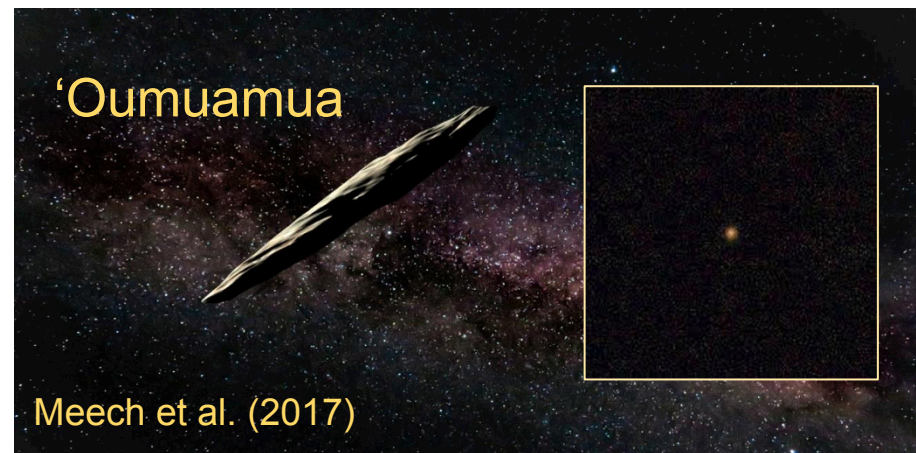
## FT: rapid response

- Submitted **every month** (e.g., 26 Feb)
  - Evaluation starts the first of the following month (e.g., 1 Mar)
  - Answer sent the 3rd week (e.g., 15 Mar)
  - Program starts the next month (e.g., 1 Apr)
  - Program ends after 3 month (e.g., 30 Jun)
- All proposers serve as referee
- Limited access to Visiting Instruments
- **Oversubscription varies**  
37 publications so far since 2015 on various topics!



## DDT: extraordinary opportunities

- Submitted directly to the **Chief Scientist** (John Blakeslee)
- **High priority** programs
- Report on work progress 4 months after observations
- Oversubscription “auto-regulated”



## PW: when we open on cloudy nights

- Submitted directly to the **Head of Science Operation – no TAC**
- For **bright targets** (typical 2-4m telescope projects)
- For poor seeing (1") and/or thick clouds (extinc. > 1mag)
- Approved based on schedule
- Best effort basis





## **The likelihood to get data (in queue mode) depends on:**

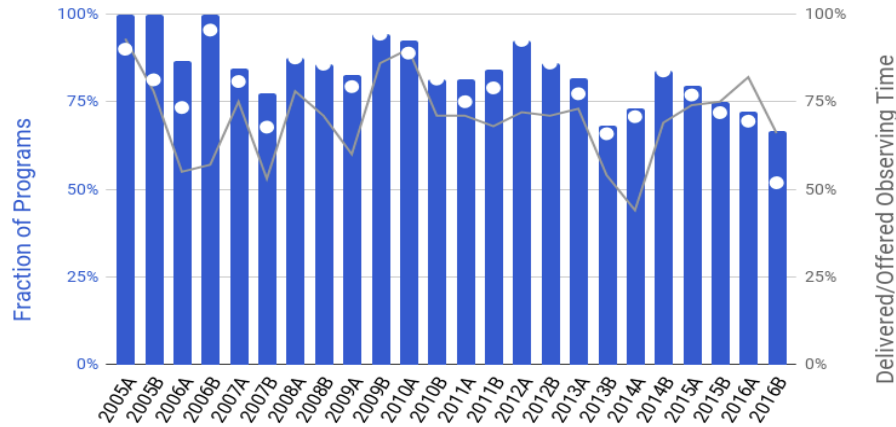
1. Program Band (1, 2, 3)
2. Program type (Q, LP, DD, FT, PW)
3. Program restrictions (timing windows, weather, frequency)
4. Program status (ToO, started, intru. configuration, ...)



# The likelihood to get data depends on

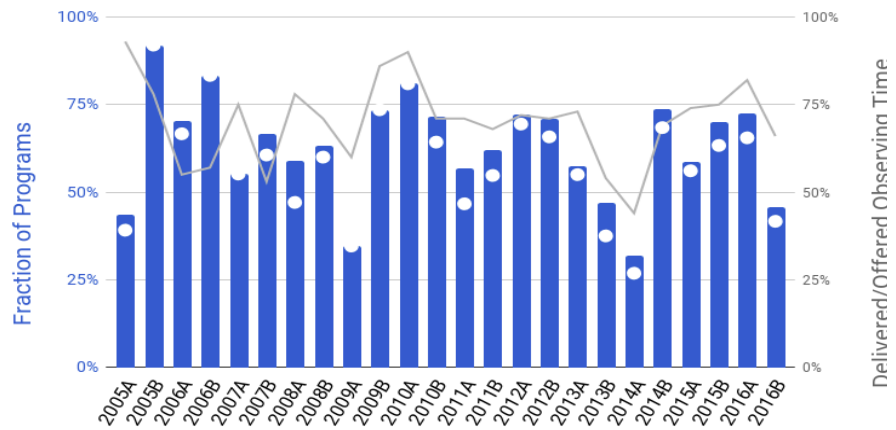
## 1. the Band

GN Band 1 Queue

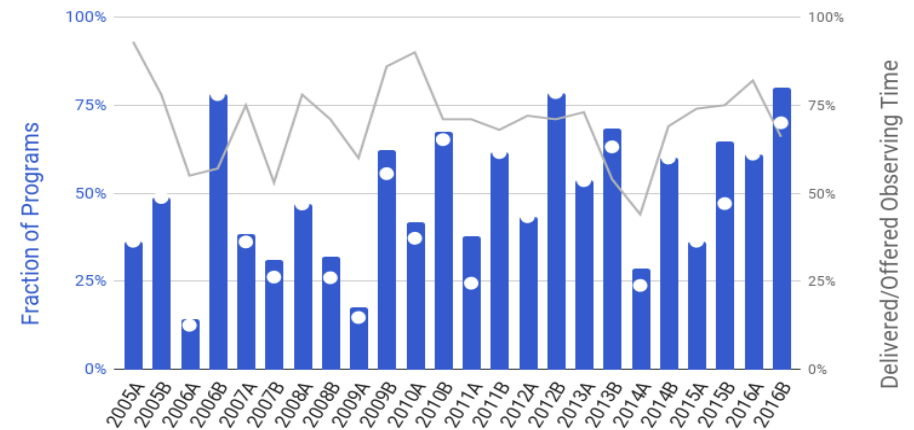


- **Band 1** has absolute priority
- **Band 3** are “fillers”
- **Band 2** are successful when the semester goes well

GN Band 2 Queue



GN Band 3 Queue



## The likelihood to get data depends on 2. the program type

↑  
(Priority increases from bottom to top)

DD	FT	Q	LP	Others
Band 1	<div><div></div><div></div></div> Band 1	Band 1	Band 1	
Band 2	<div><div></div><div></div></div> Band 2	Band 2	Band 2	
			Band 3	
			Band 4 (PW)	

NOTE: this is a methodology

# The likelihood to get data depends on

## 3. the program restrictions

- **Timing Windows:** Timing windows matter, and observations can be scheduled in better conditions than requested if needed to try and meet a timing window.
- **Time frequency:** Same as for Timing Windows, time frequency requirement is followed (after the priority based on the Bands has been considered).
- **Weather constraints:**
  - *Best weather conditions* (IQ20%, CC50%) happen 10-15% of the time.
  - Execution in better than requested conditions will on average lead to lower completion rates!
  - *Water Vapor* and *Sky Background* restrictions are taken into account.

NOTE: this is a methodology

## The likelihood to get data depends on 4. the program status

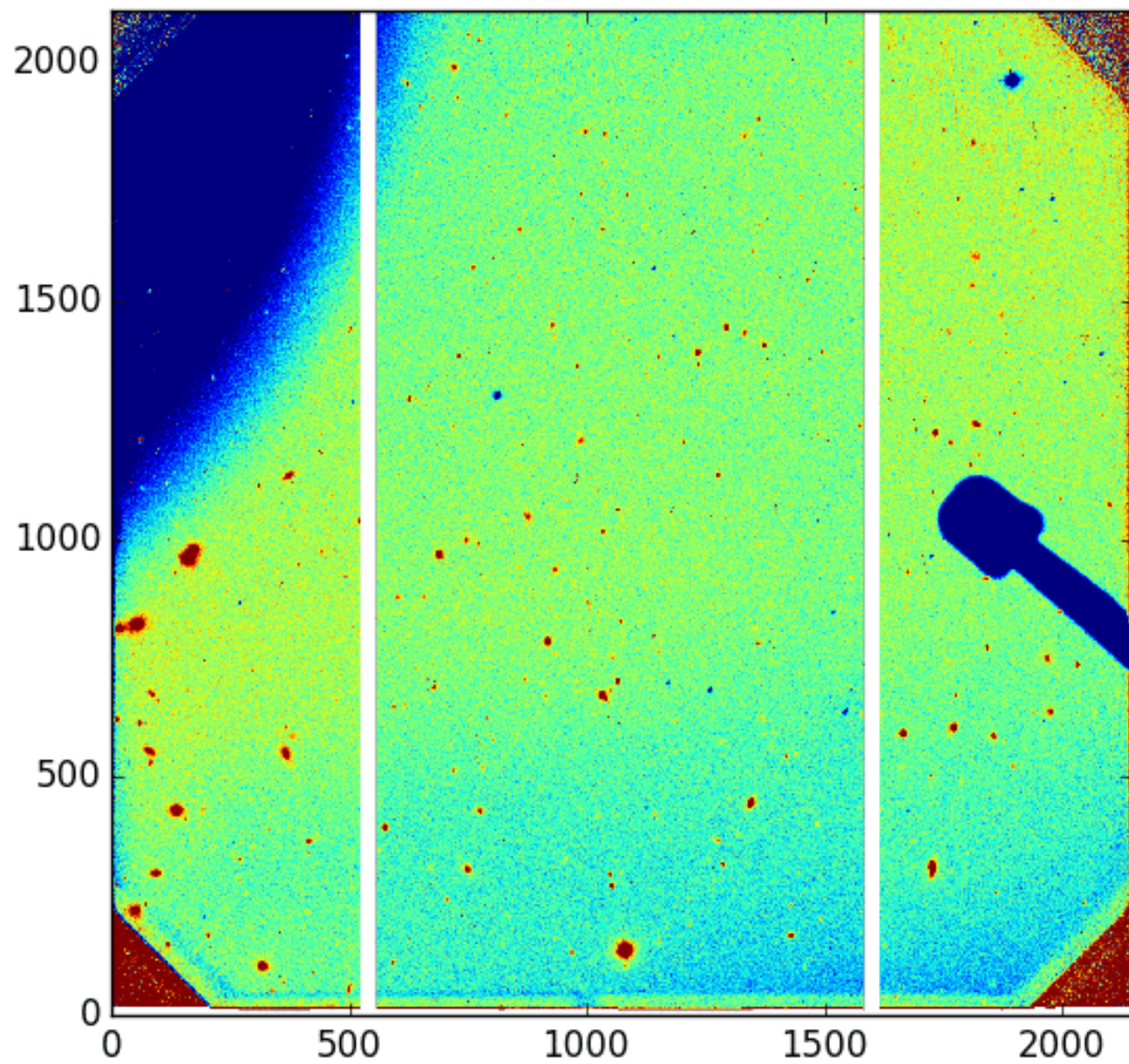
- **Rapid ToOs:** Take absolute priority (within their band) when they are triggered.
- **Standard ToOs:** Need to be done before their timing window ends (days to weeks).
- **Current completion:** Programs that have been started should get priority over non-started ones, until they reach 80% completion.
- **R.A.:** Earlier targets take priority if we are about to lose them.
- **Instrument configuration:** Between two equivalent programs, one can take priority if it needs the same configuration as a higher priority program.
- **Visiting instruments programs:** Because they are “block scheduled”, they get higher priority when the instrument is on the telescope.
- **Known thesis projects:** They are completed first

NOTE: this is a methodology

## **Band 3 program are “fillers”**

Will only be started if:

- **Weather conditions** not covered by Band 1 and 2
- **RAs** not covered by Band 1 and 2
- Has a reasonable chance of **getting completed**, or a useful subset of observations can be completed.
- Brownie points for **thesis project**.
- If it is a GMOS program, it is better the **configuration** is commonly used by Band 1 and 2 programs.



## US UCG representatives

- Karen Meech (Chair and UH rep but the one who brought this up)
- Matt Bayliss (CfA)
- Jessica Werk (UW)
- Vini Placcus (Notre Dame)
- Mark Brodwin (U. Missouri)
- <http://www.gemini.edu/science/#ucg>

## NOAO User's Committee

- <http://ast.noao.edu/about/committees/usercom>



Didymos17A - Gemini PIT

File Edit View Catalog Help

Time Requests

Proposal Class: Observing at Gemini

Consider for Band 3: Yes

13.84 hr (12.02 hr minimum) requested

TDO Activation: None

Request Type: Gemini Partner Request

Partner	Time	Min Time	Lead
Argentina			
Australia			
Brazil			
Canada			
Chile			
Republic of Korea			
University of Hawaii			
United States	13.84 hr	12.02 hr	Joanna Thoma...

Total request: 13.84 hr (12.02 hr min) | Band 3 request: 13.84 hr (12.02 hr min)

Overview

Time Requests

Scheduling

Submit

TAC

Problems

Description

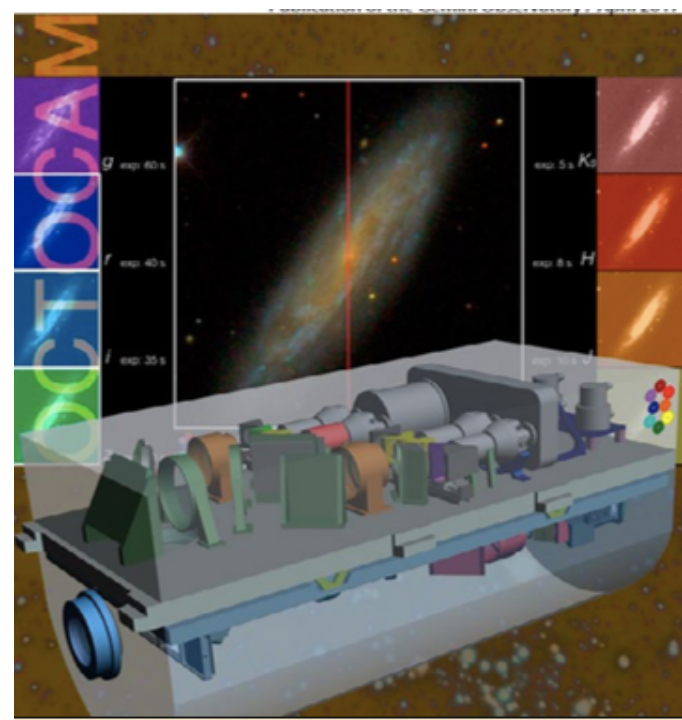
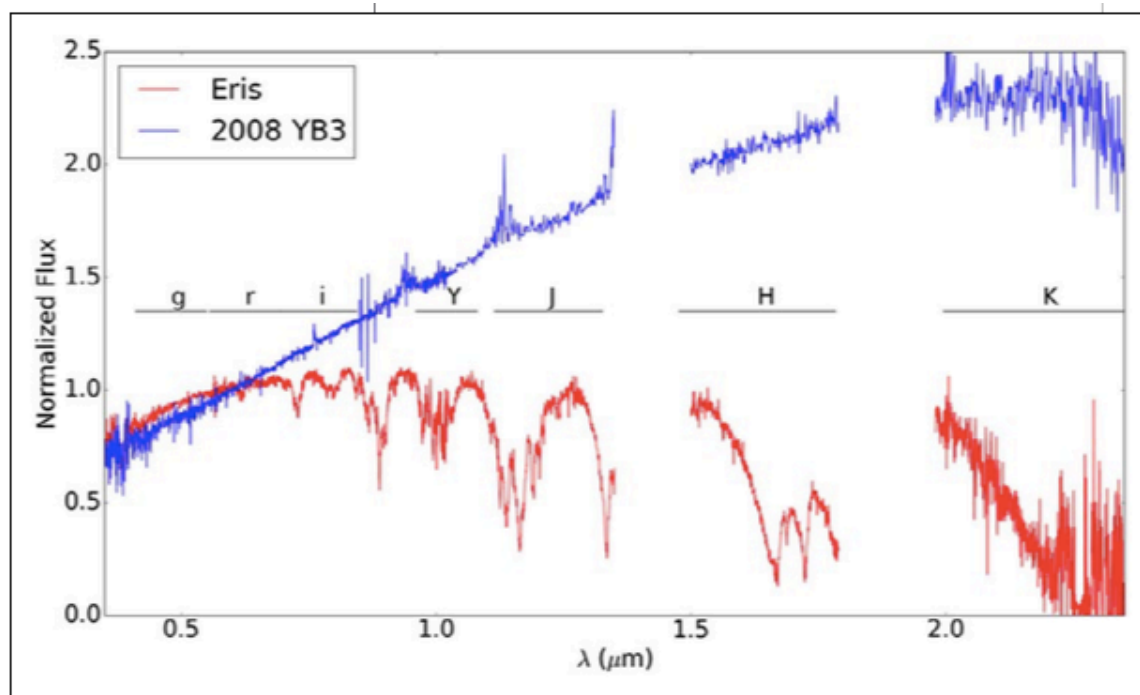
## Lessons Learned

- Lesson #1: Be prepared submit FT proposals shortly after the regular program notifications (June and December)
- Lesson #2: Relax sky brightness condition as a last resort. For solar system objects sky brightness can be a double whammy because of the likelihood of getting close to the waxing or waning moon.
- Lesson #3: Until GMOS bubbles are corrected, track non-sidereally or dither to keep target in the central area of CCD2.
- Lesson #4: US Solar System Community needs to advocate for better representation amongst the rankings that come out of the combination of the sub-TACs.
- Lesson #5: If you need timing windows, say no to band 3.



formerly  
OCTOCAM

8-channel imager and spectrograph capable of multi-band imaging, long slit broad-band spectroscopy and high-time-resolution (Gemini-South)



Contract Signed on March 3, 2017  
CoDR passed on August 3, 2017  
Preliminary Design Review April 4-5, 2018  
Expected Commissioning March 2022

