Highlights of Science, Instrumentation, and Operations at CTIO: 1969 - 1986

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Science

- Context
  - BB^2FH 1957, Burbidge 1959, X-ray 1962, Quasars 1963, Background Radiation 1965, Pulsars 1967
- CTIO Surveys
  - Stars, galactic structure, globular clusters, Magellanic Clouds, Galaxies, Quasars
  - Sanduleak, SN1987A
  - X-ray binaries, neutron stars, black holes, WD oscillations
  - RR Lyrae stars, Carbon/M stars
  - (Rubin/Ford, too)

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Instrumentation

- It was possible to do forefront astronomy with
  – Photographic plates
  – The human eye (visual binaries)
    - The power of the eye-brain image processing system
  – Single channel photocells (1P21s and successors)
  – Computers with memories of KB, disks of <1 MB
  – No internet!

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- Harvard scanner
  - 2 channels, coverage to the near IR
- Vidicons, intensified vidicons
- The first CCDs (256^2)
- Single channel IR photometers
  - (The adventures of shipping LHe via Braniff…)

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Operations

- Building and operating a high-tech observatory at the end of a 6000-mile supply line
  - Local suppliers only for construction and basic materials
  - Everything else had to be imported by air and ship
  - Operating a 24/7, 363-day/yr observatory for international visiting astronomers
  - Recruiting and developing local staff

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CTIO as a Model International Observatory

- Clear mission: Provide front-rank observing and instrumentation facilities for astronomers from the Americas (and rest of the world)
- Clear objectives for the staff
  - Leading research
  - Excellent support of visiting astronomers
  - Maintain/improve telescopes, instrumentation, facilities
- Great leadership and commitment by all
  - Victor Blanco set the vision

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CTIO as a Model International Observatory

- Commitment to being a responsible partner and member of the Chilean community
  - At the local level
    - Employment and career development opportunities
    - Educational opportunities
  - At the national level
    - Partnering with Chilean universities

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Advantages of the Time

- CTIO was independent
- Much less bureaucracy, oversight…
- Telescopes and instrumentation were
  – Smaller
  – Less expensive
  – Could be developed and supported by individuals and small groups
    - In less time

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What changed?

- Increasing pressure on funding
- The deep recession of the early 1980s
  – Combined with the fixed exchange rate
    - Ch$39/dollar
- This forced a downsizing and restructuring of operations and staffing
- Precursor of the present era

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External changes

- Pressures to combine the U.S. national observatories
- Leading to the formation of NOAO
- Formation of international partnerships for next generation of large telescopes
  - Gemini, ALMA
  - Continuing buildup of ESO

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Changes in technology and science

- Astronomy itself advanced at a ‘Moore’s Law’ pace
  - Directly, via the advances in computing, detectors, and electronics
- The internet revolutionized astronomy as it did everything else
  - Enabling international research collaborations
- The field went digital
- Research teams began to replace individual PI’s and small groups

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External changes

- The large physical scale and cost of 10-30-m class telescopes
  - And their instrumentation
- The growing together of high-energy physics, astrophysics, cosmology, astronomy
  - Scientifically
    - Inflation, cosmology, dark matter, dark energy
  - Technically
    - Think Sloan, LSST, etc
  - Managerially
    - To make large projects work

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CTIO in the 21st Century

- Back at the forefront
- Large:
  - SN and Dark Energy Accomplishments
  - DECam
  - LSST, the top-priority, NSF/DOE project
- Small:
  - The forest of small, robotic telescopes on CTIO for specialized projects

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Continuing Challenges

- The role of NOAO in national astronomy
  - Connection with Gemini
- Whither ground-based OIR astronomy in the U.S.?

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