Burning Plasma Physics Advisory Committee

ATLAS Collaboration Issues

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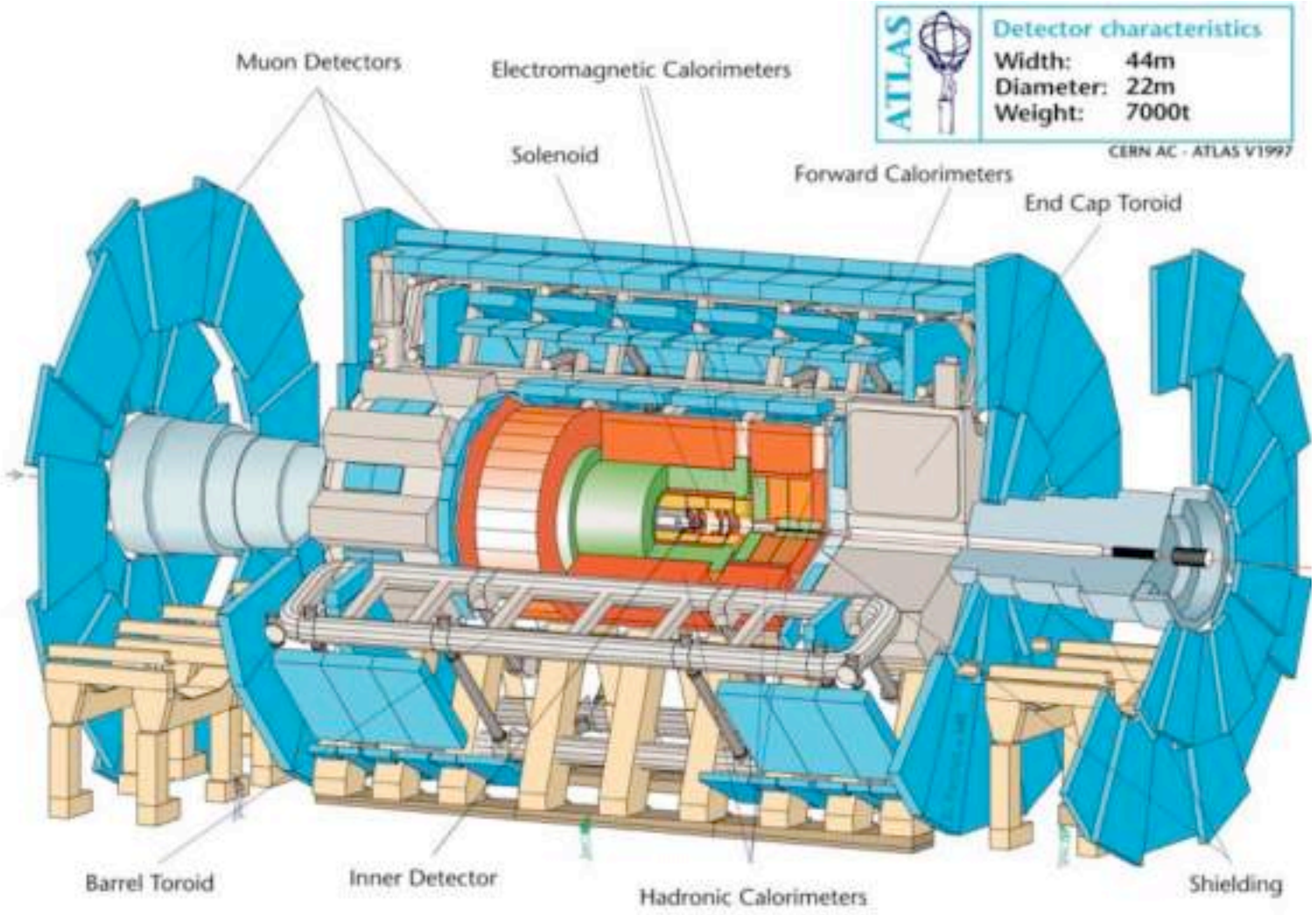
Introduction

- Real US ATLAS organization and management work by
  - Bill Willis (Columbia), Project Manager
  - Howard Gordon (BNL), Deputy Project Manager
  - Have done an outstanding job!
    - Lots of challenges
- My role
  - Former Convener US ATLAS Institutional Board (2 years)
  - Former Chair/Deputy Chair ATLAS Collaboration Board (4 years)
    - Participated in monthly ATLAS Executive Board meetings

Background Info

- US ATLAS experience may or may not be relevant to ITER
  - US University groups plus national labs
    - 3 national labs, 30 universities
  - ~20% of the international effort on ATLAS
    - Both for physicists and hardware costs
  - Experimental site is “off-shore”
    - CERN, Geneva, Switzerland
    - Non-US host laboratory
      - unlike previous large US HEP projects
    - Many funding agencies involved (37)
  - US construction funds outside normal HEP base program funding of institutions

The ATLAS Detector



US ATLAS Responsibilities

- ATLAS Common Projects
  - ~45% of detector costs
    - Magnets, shielding, cryostats, etc. (heavy industrial items)
    - Shared by partners in proportion to detector deliverables
    - Cash or in-kind (55%) contributions
- ATLAS detector systems (US part of all systems)
  - Inner detector
    - Pixels
    - Silicon strip detector
    - Transition radiation detector
  - Liquid Argon electromagnetic calorimeter
  - Scintillating tile hadronic calorimeter
  - Muon detector
  - Trigger/Data Acquisition system

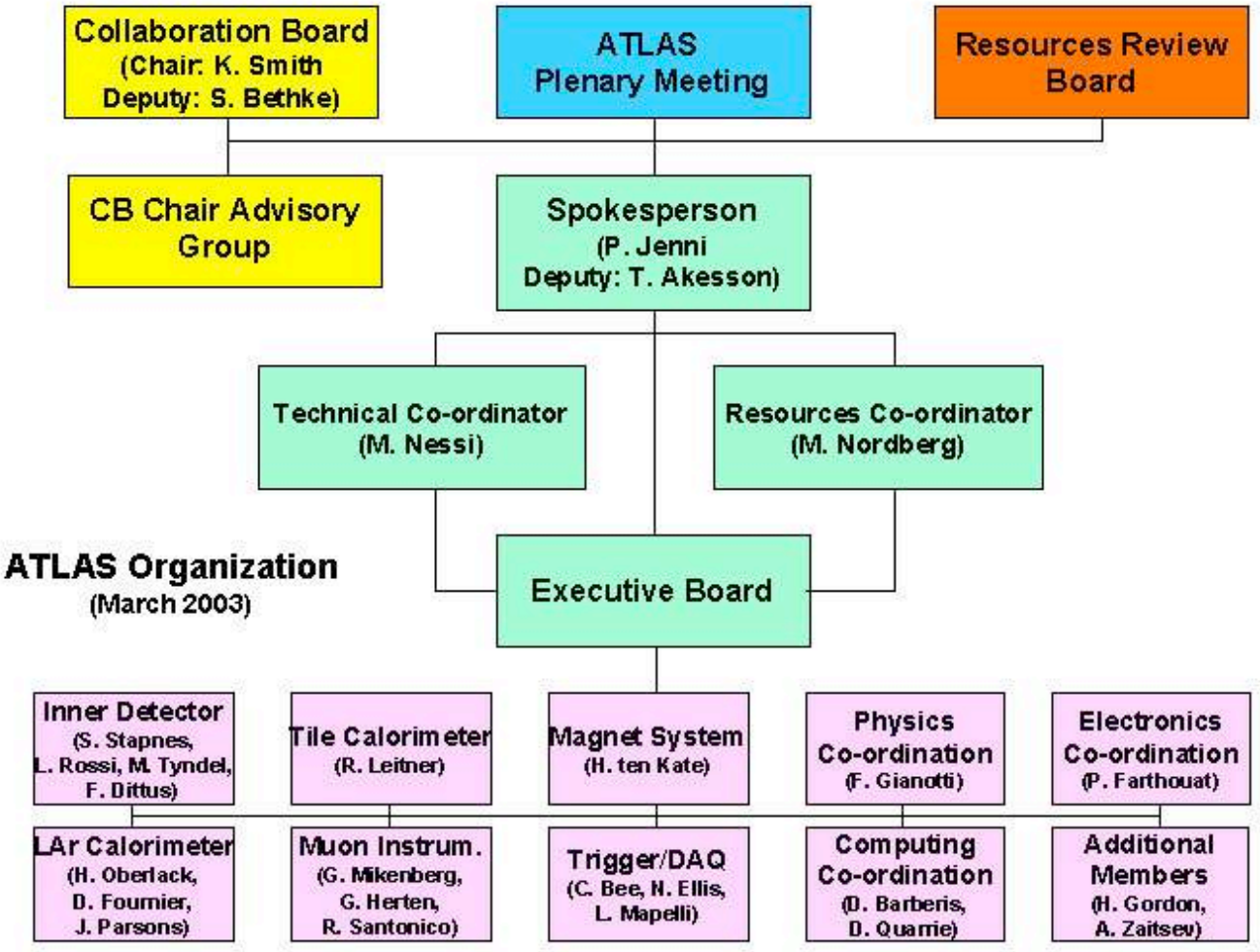
Cost Allocations

- All costs estimates reviewed by a CERN oversight team prior to project approval
  - 475 MCHF in ’95 (CORE costs)
    - Materials only (by European tradition)
  - Became the “official” cost of the detector
  - Basis for cost sharing
  - No contingency included
    - Traditions vary with funding agency
      - Agency may hold contingency rather than project manager
- MOUs written between CERN and all national groups
  - 34 countries (37 funding agencies)

US ATLAS Responsibilities

- Detector commitments are for deliverables
  - These are the primary need of the experiment
  - VERY useful concept
    - Places cost responsibility at the national level
      - Closer to where costs are incurred
      - Closer to the source of funding
  - US costs larger than corresponding CORE costs
    - Used own cost estimates
    - Included labor costs
    - Included contingency
    - Allows US ATLAS to control its own destiny
    - Some initial tension with ATLAS management since US funding level was known
    - $165M bought ~81MCHF CORE costs

ATLAS Organization



ATLAS Organization

- Collaboration Board
  - 1 representative from each institution
    - 151 institutions from 34 countries
  - Elects spokesperson
  - Must ratify spokesperson's selection of executive team
    - Technical Coordinator
    - Financial Coordinator
    - Physics Coordinator
    - Computing Coordinator
- Detector Systems
  - Most technical work by physics groups done here
  - Deliverables divided among collaborating institutions
    - Part of national MOUs
  - Coordinated by a detector project leader

ATLAS Organization

- Resources Review Board (RRB)
  - Established and chaired by CERN
  - Includes representatives of all funding agencies
  - Meets twice per year
  - CERN reports to RRB on global issues
    - LHC construction status
    - Central computing
  - Experiments report to RRB
    - Status of construction
    - Financial status
    - Request budget approval for following year

ATLAS Organization

- Project tracking
  - Monthly reports to central web-based system
    - Costs (fraction of allocation), technical progress
  - Reviews (by Technical Coordination group)
    - Design reviews (all deliverables)
      - Preliminary
      - Final
    - Production Readiness Review (all deliverables)
      - Prior to letting contracts
    - Production Advancement Review (all deliverables)
      - At 15% and 50% completion levels
    - System Overview Reviews
    - Safety

ATLAS Integration

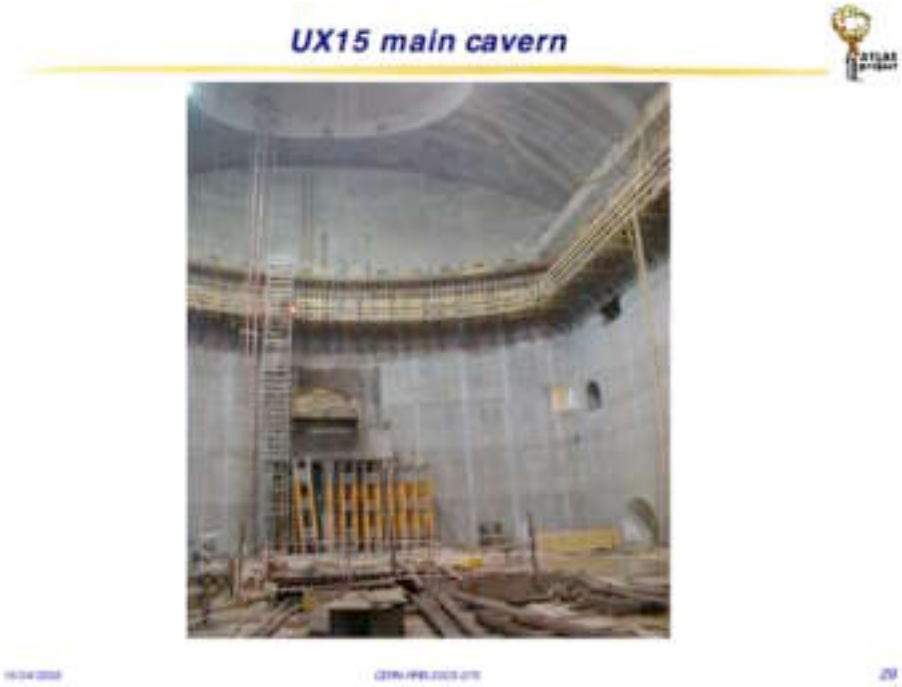
- Detector integration at CERN
  - Assembly of detector systems from sub-assemblies provided by collaborators
  - Done in surface buildings at CERN
  - Requires on-site manpower
    - Expensive for US
  - Pre-operation costs begin for testing assemblies
    - Cryogenics systems
    - Electrical power
    - Electronics cooling

ATLAS Integration

ATLAS Installation

- In underground area
  - Begins now and lasts ~3.3 years
    - 6 phases with ~1900 tasks per phase
- Coordination critical
  - Many complex constraints
  - Timing is tight
    - Collider expected to be available in April ’07
      - Cannot operate while detector installation is in progress
  - Components must be available on time
  - Manpower intensive
  - Adequate resources essential

ATLAS Installation

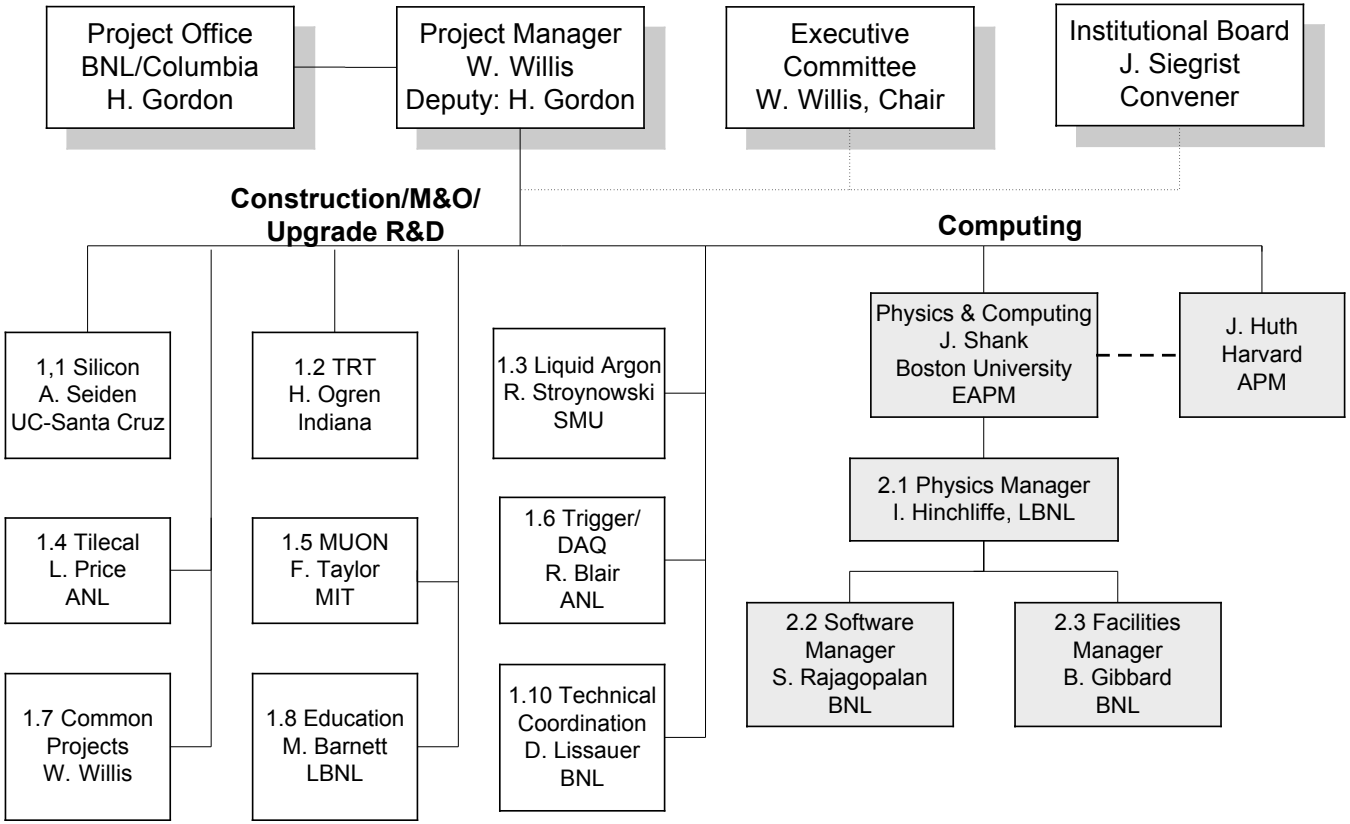


Other ATLAS Functions

- Outreach committee
  - Prepares PR and educational material
    - Movies
    - Photos
    - Posters
    - Web material
    - Brochures
  - Very important for public visibility
- Physics coordinator
  - Organize physics studies within collaboration
  - Ensure adequate representation at national and international conferences and meetings

US ATLAS

U.S. ATLAS Organization



US ATLAS

- Counterparts to ATLAS functions
  - Project manager instead of spokesperson
  - System managers
  - Institutional Board instead of Collaboration Board
  - Physics Coordinator
  - Outreach coordinator
- Important difference between US ATLAS and ATLAS
  - US ATLAS project manager controls all US funds
  - In ATLAS detector funds held by system groups
    - Common project funds held by ATLAS

Overview - what works?

- US is a very welcome participant
  - Funding has been flexible, reliable (but capped)
    - Has given ATLAS spokesman ability to respond to problems
      - Eg. Technical Coordination manpower
    - US has worked with ATLAS to decide allocation of contingency
- Well organized structure and clear plan are critical
  - Loss of independence for physicists but justified by physics return if efforts are well used
- Transparency very important
  - To ensure support and confidence of science teams

Overview - what works?

- Avoid international partners on same deliverable
  - Blurs responsibility
- Clear definition of interfaces essential
  - So “pieces” fit together
    - Mechanical items
    - Electronics
    - Software
  - Formal and explicit documentation valuable
- Not too much flag waving
  - Work constructively with partners to solve technical problems
  - DOE and NSF very “enlightened” in this regard

Conclusions

- Construction of detector elements advancing well
  - Work done at individual institutions
- Integration at CERN is underway
  - A central effort
  - Manpower intensive (expensive for US)
- Installation will begin later this year
  - Will be a challenge
  - US contributing strongly to ATLAS Technical Coordination group
- This international project will allow us to do path-breaking science we couldn't do otherwise