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

Collaboration Board
(Chair: K. Smith
Deputy: S. Bethke)

CB Chair Advisory Group

ATLAS Plenary Meeting
(Spokesperson
(P. Jenni
Deputy: T. Akesson)

Technical Co-ordinator
(M. Nessi)

ATLAS Organization
(March 2003)

Executive Board

Resources Co-ordinator
(M. Nordberg)

Inner Detector
(S. Stapnes,
L. Rossi, M. Tyndel,
F. Dietz)

Resource Co-ordinator
(H. Oberlack,
D. Fournier,
J. Parsons)

Tile Calorimeter
(R. Leitner)

Muon Instrum.
(G. Mikenberg,
G. Herten,
R. Santonico)

Magnet System
(II. ten Kate)

Physics Co-ordination
(F. Gianotti)

Electronics Co-ordination
(F. Farthouat)

Trigger/DAQ
(C. Bee, M. Ellis,
L. Mapelli)

Computing Co-ordination
(T. Barbera,
D. Quarrie)

Additional Members
(H. Gordon,
A. Zaitsev)
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

Barrel Toroid Integration

Integration 1: cold mass preparation

Goal: Put 2 double pancakes (DPCs) under pre-stress in coil coating

- Using resin injection and curing
- 3 cold masses ready, 2 more under preparation
- This phase will end, on schedule, in September '03

Barrel EM cylinder assembly

LAr EM barrel assembly in the vertical position

The first LAr EM half-barrel cylinder has been assembled and recently inserted into its final position in the barrel cryostat

LAr EM half barrel after insertion into the cryostat

LAr End-Cap Cryostats – C

LAr End-Cap cryostat during feedthrough installation

Crystal ready for detector installation
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

UX15 main cavern

First detector elements installed: TX1S shielding

TX1S: Shielding interface between LHC machine and ATLAS

7 April 2003
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
U.S. ATLAS Organization

Project Office
BNL/Columbia
H. Gordon

Project Manager
W. Willis
Deputy: H. Gordon

Executive Committee
W. Willis, Chair

Institutional Board
J. Siegrist
Convener

Construction/M&O/
Upgrade R&D

1.1 Silicon
A. Seiden
UC-Santa Cruz

1.4 Tilecal
L. Price
ANL

1.7 Common
Projects
W. Willis

1.2 TRT
H. Ogren
Indiana

1.5 MUON
F. Taylor
MIT

1.3 Liquid Argon
R. Stroynowski
SMU

1.6 Trigger/
DAQ
R. Blair
ANL

1.8 Education
M. Barnett
LBNL

1.0 Technical
Coordination
D. Lissauer
BNL

Computing

Physics & Computing
J. Shank
Boston University
EAPM

J. Huth
Harvard
APM

2.1 Physics Manager
I. Hinchliffe, LBNL

2.2 Software
Manager
S. Rajagopalan
BNL

2.3 Facilities
Manager
B. Gibbard
BNL
**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 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