News from CERN/LHC++

- Class Libraries
  - CLHEP, Tools.h++, STL, ObjectSpace
- Platforms
  - Linux, NT
- Future of "CERNLIB"
  - Maintenance, NAG
- LHC++
  - Iris Explorer, histOO, Objectivity

Class Libraries

- Tools.h++ (RogueWave)
  - not officially supported any more
  - use Standard C++ Library instead
  - Geant4 will/tries to switch to STL …
  - They will have a hard time for the 98 releases
  - supported on more platform than STL
  - almost all features can be replaced with sometimes very tricky STL code (delete-, sort-iterators, adapters) e.g. `clearAndDestroy(),RWTPtrSortedVector`
  - DD: pragmatic - use for transient classes if it makes life easier

Class Libraries

- Standard C++ Library (STL + more)
  - seen as THE future standard at CERN
  - problem: implementations vary considerably (STL ≠ STL)
  - very powerful, but often very cryptic
  - use one implementation only: ObjectSpace
- ObjectSpace
  - Objectivity implemented *persistent* version of ObjectSpace
  - ⇒ use also for transient version
  - problems on LINUX
  - CERN wide license: $40,000
  - possible conflicts if compiler comes with Std. Library

Class Libraries

- Math.h++ (RogueWave)
  - not good enough
  - best part is the random engine/generator part (adapted in CLHEP)
- CLHEP
  - nobody likes it (JS: political decision)
  - ‘everybody’ agrees that it is NOT the best solution/implementation
  - DD: global constants ‘m, g, s’ must go (hard for G4!, sed on m?)
  - DD: abs, max, min must go (conflict with STL)
  - JS: next release without String, Alist (use STL instead)
  - JS/DD: CLHEP needs to be changed, open for improvements written in the context of STAR
    (i.e. templated ThreeVector, LorentzVector)
  - JS: asks STAR to join LHC++ video May 11 to discuss issues

Platforms

- CERN seems to focus on the following platforms:
  - HP-UX 10.20, Solaris 2.5.1, AIX/6000 4.15, IRIX 6.4, NT
  - NT pushed a lot
  - only one compiler/platform and one OS/platform
  - (see also CCN 229 and http://wwwinfo.cern.ch/asd/lhc++/platforms.html)
- Linux not welcome?
  - not support by many commercial products/vendors (NAG, ObjectSpace)
  - needs a lot of support contrary to CERN politics to use more and more commercial solutions
  - ATLAS shows increasing interest in Linux
    - ⇒ might become an issue

Future of “CERNLIB”

- CERNLIB
  - frozen but not abandoned until 2003
  - current effort ≈ 2h/week
  - mathlib not supported anymore
  - JS: software decay (“*STAR should be aware of this*”)
- Replacement
  - CLHEP
  - NAG: covers all functionality of mathlib except for 12 special functions
  - JS: ongoing negotiations with NAG to turn current NAG mathlib into class library

Future of "CERNLIB"

- HBOOK
  - to be replaced by persistent/transient **histOO**
  - **histOO** currently rewritten (incorporate new ideas)
  - DD: Root ⇔ histOO comparison a fake
    - change 1 statement: 2 x faster than reported
    - debug off/ opt on: 4 x faster than reported
  - DD admit that still slower than old **HBOOK**
    - DD: advantage if many and large histos
    - can be naturally packed into classes etc.

Future of “CERNLIB”

- Histograms
  - PAW replaced by HepExplorer (LHC++ Project)
    - Composed of several packages:
      - » **IRIS Explorer (v3.9)(NAG)**
      - » **Open Inventor (v2.4)**
      - » **Open GL (v1.0)**
      - » **Objectivity (v4.0)**
      - » **ObjectSpace (v2.0)**
  - Preliminary release available from CERN
  - requires several licenses
  - rudimentary functionality (currently)

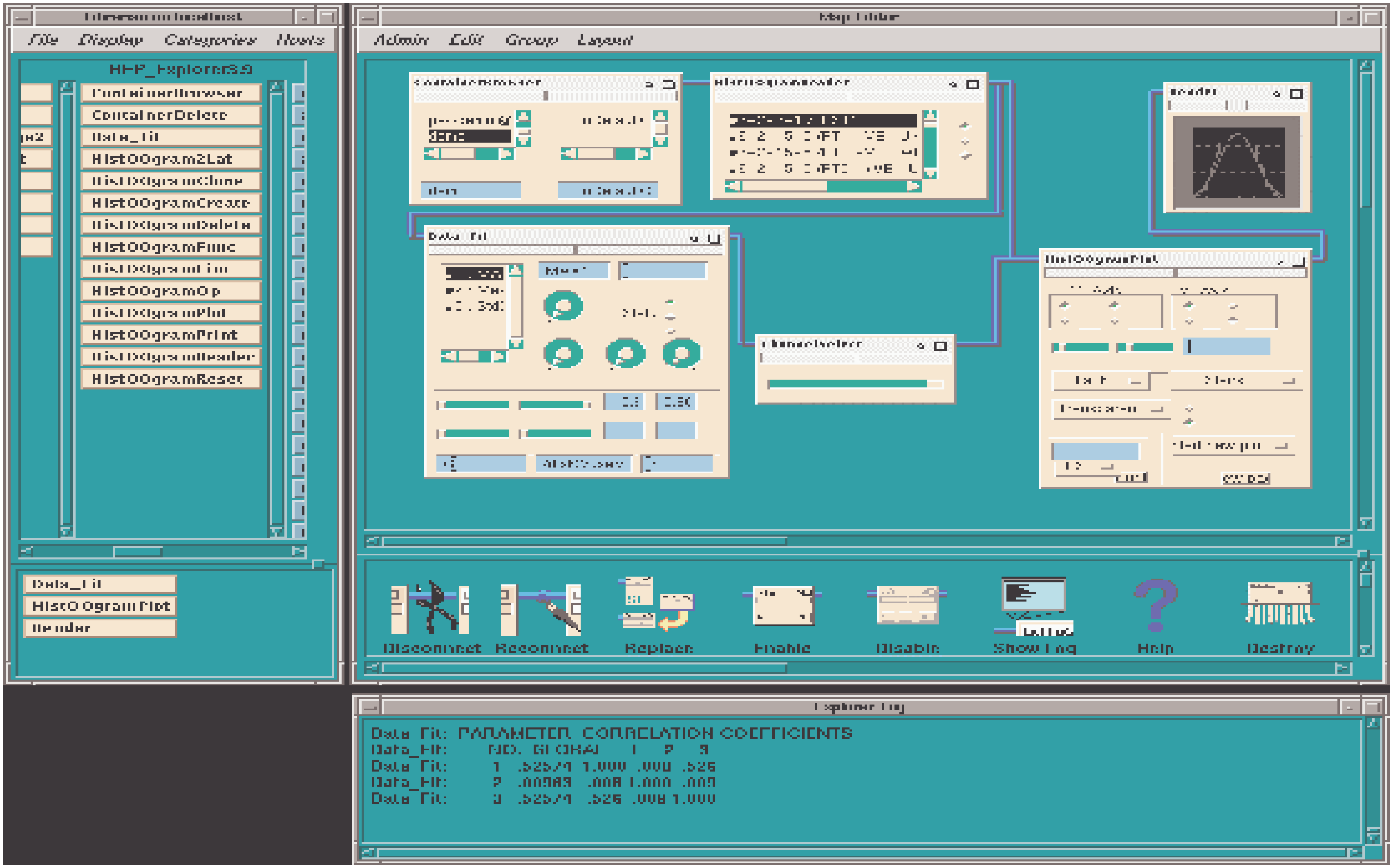
Licensing Costs

Component	Maintenance	Comments
RW Tools.h++	3.6 kCHF	
NAG C library	14 kCHF	Annual charge
NAG Fortran library	26 kCHF	
Graphics Bundle	35 kCHF	OpenGL on HP/Sun, vendor OpenGL elsewhere, OpenInventor, Master Suite.
IRIS Explorer	14.5 kCHF	
Objectivity/DB	42 kCHF	Existing Licenses

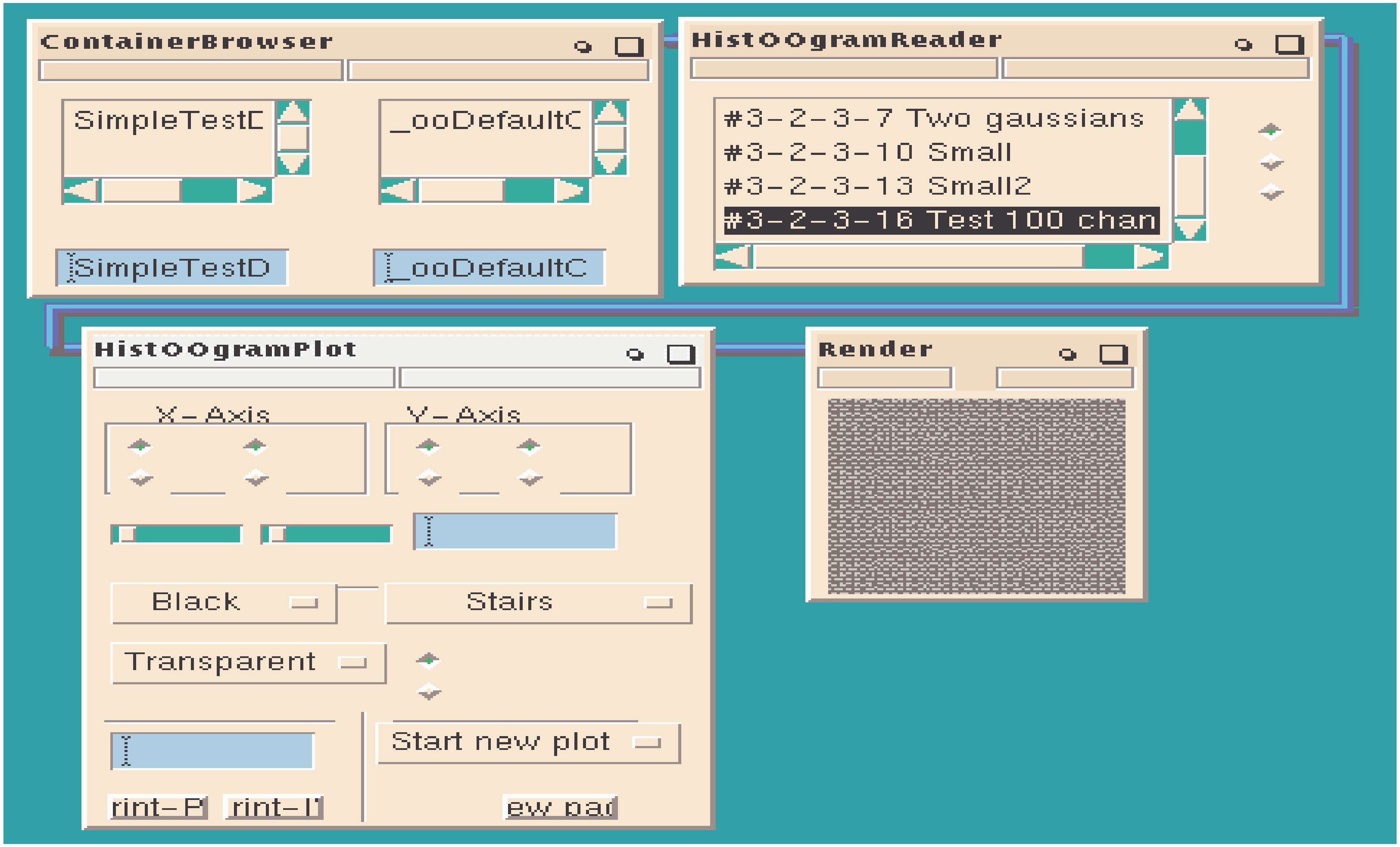
LHC++ 1998 Supported Platforms

Platform	OS	Compiler
HP	HP-UX 10.20	aCC A.1.06
IBM	AIX 4.2	X1C 3.1
SGI	IRIX 6.4	C++7.1
DEC	Digital Unix 4.0	C++ 5.5
SUN	Solaris 2.5	SunPro 4.1
NT	4.0	MVC++5.0

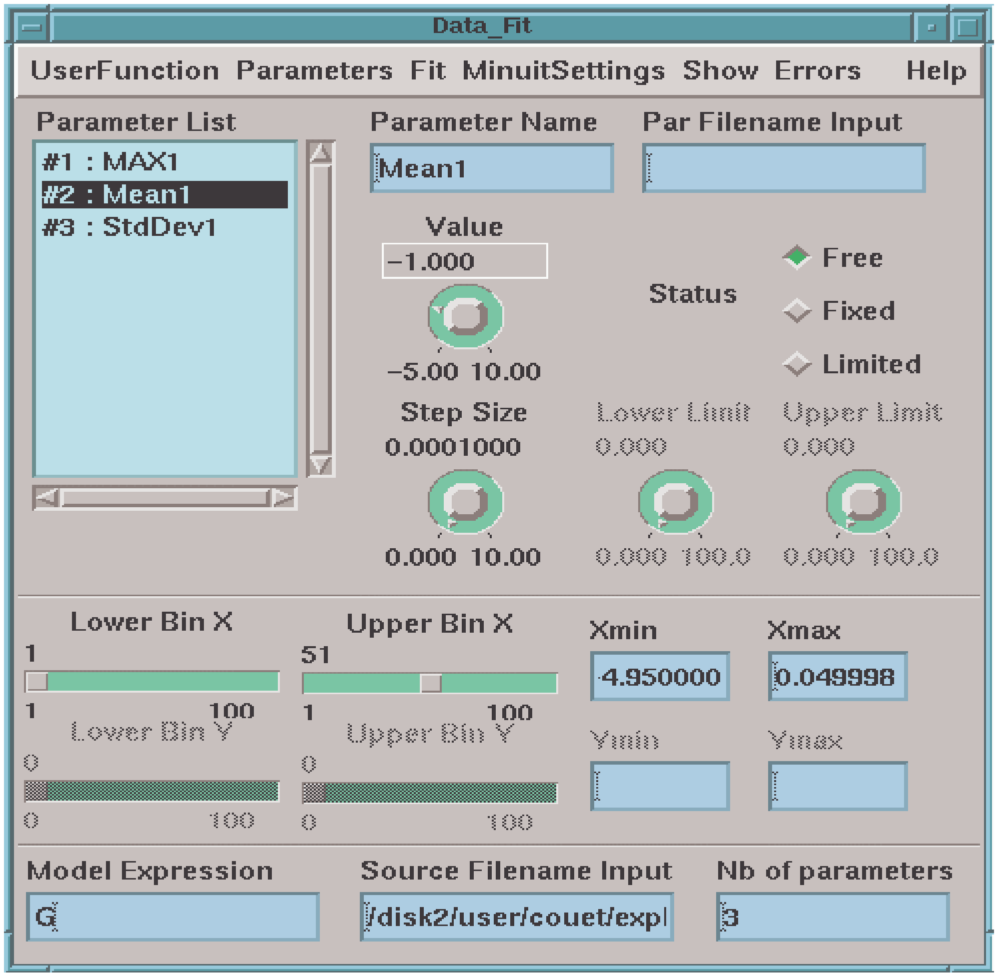
HepExplorer



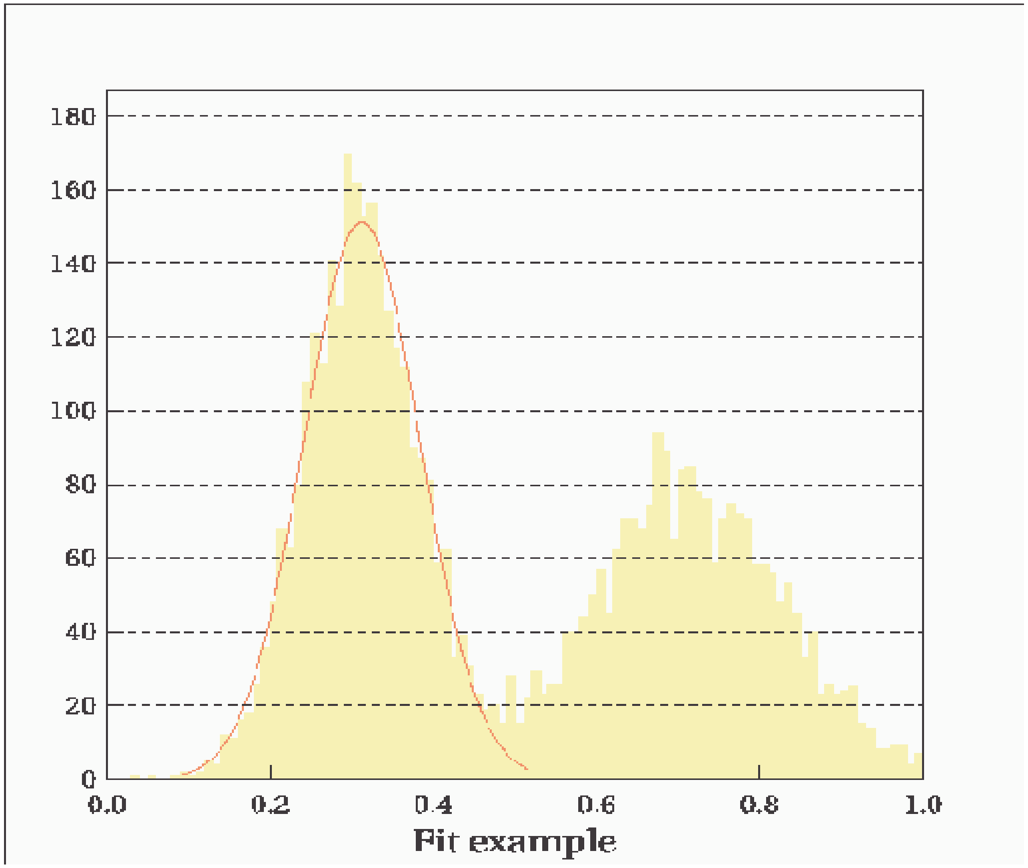
Histogramming Module



Fitting a Histogram



A Histogram



LHC++

- **Objectivity**
  - include BaBar calibration DB
  - waiting for Objy5
    - HP: aCC support
    - Solaris/NT comm. problems solved (NA45)
  - JS/DD very skeptical about GC strategies
    - technical concerns
- **First experiences with NT cluster/Objy**
  - NA45: CS2 (Solaris) for mass storage, small NT cluster (7 nodes) to process data
  - Matthias Messer (NA45) will report in June (?)

And ...

- DD: gmake on NT
  - solves many problems, ease portability
- OpenGL, OpenInventor heavily used
- g++
  - bad reputation?
  - better solutions for Linux exist (commercial)
- Visual C++
  - people like it (as a compiler)
  - still no full support of ANSI features