

Tracker Construction Database

*GLAST Ground Software Workshop
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*DB requirements
relevant info for subsystems integration
implementation: custom or available products*

DataBase Requirements

Level structure

wafer->ladder->tray->tower - hybrids/detectors/mechanics

data flow

parallel levels with interface+crosschecks

series of test operations with data input (workflow)

Distributed - repeated access

input

<- **industry**

<- different **institutes**

(italy:pisa,trieste,roma2,perugia,bari)

<- different **steps** of production/selection

(ex. working chans before/after bonding,

VI measurement before/after irradiation)

output

-> **data flow between levels**

-> **data crosschecks**

(ex. badchans=(hybrids)OR(sensors))

-> easy interface to allow

statistics for quality production

-> interface to geometry files

for calibration and science analysis

central repository +WEB / local servers+WEB

need backup at each update/logfiles to register access

Integration info

SSD

ID

- series number
- tester/place/date

geometrical (manufacturer/pre-rad)

- global: wafer thickness, length, pitch
- cut/mask alignment
- strip x strip : implant/metal width

electrical (manufacturer/pre-rad/post-rad)

- C (global) : $C_{\text{depletion}}$
- C (strip x strip) : C_{coupling} , $C_{\text{interstrip}}$ -> bad chans list
- R (strip x strip) : R_{bias}
- V-I (global) : $V_{\text{depletion}}$, I_{leakage}

Integration info

Ladder

- ID-SSD
- I_{leakage}
- bad chans list
- OR(SSD) - before/after bonding
- alignment

Tower

- ID-trays
- bad chans list
- alignment
- integration with CAL data
- calibration
- interface to analysis software

Tray

- thermal/mechanical test from manufacturer
- converter specs
- ID-ladders
- bad chans list
(ladders)OR(hybrids)
before/after assembly
- DAQ lab test (cosmic rays)
occupancy/noise/efficiency

Implementation - Custom solution

GLAST SSD Test Sheet

Detector ID #	Tester	Date	Manufacturer's test values	GLAST Value (Pre-Rad)			GLAST Value (Post-Rad) 100cy		
				Detector	Skinny	Baby	Detector	Skinny	Baby
I(150v)	[nA]								
I(175v)	[nA]								
V(dep)	[V]								
c(dep,1kHz)	[pF]								
#of Bad chamels									
R(Ave)	[M0hm]								
R(High)	[M0hm]								
R(Low)	[M0hm]								
R(Al Strip)	[0hm]								
R(Int-2neighb.)	[60hm]								

SSD data sheet
from Hartmut
template

colour code

Bias Width	[cm]					Inner Edges of Bias Ring
Bias Length	[cm]					Inner Edges of Bias Ring
Width Distance	[micron]					Edge-Inner Edge Bias Ring Right
Length Distance	[micron]					Edge-Inner Edge Bias Ring (Res. End)
Pitch	[micron]					
Implant Width	[micron]					
Metal Width	[micron]					
Alignment First	[micron]					
Alignment Last	[micron]					Centering of Strips Implant-metal
Bonding Pads location						Agree with Table 5.1 in Specs?
Fiducial Marks location						Agree with Table 5.1 in Specs?
Test Structures						Agree with Figure LAT-GD-0002?

repeated access

ID

electrical

geometrical

comments

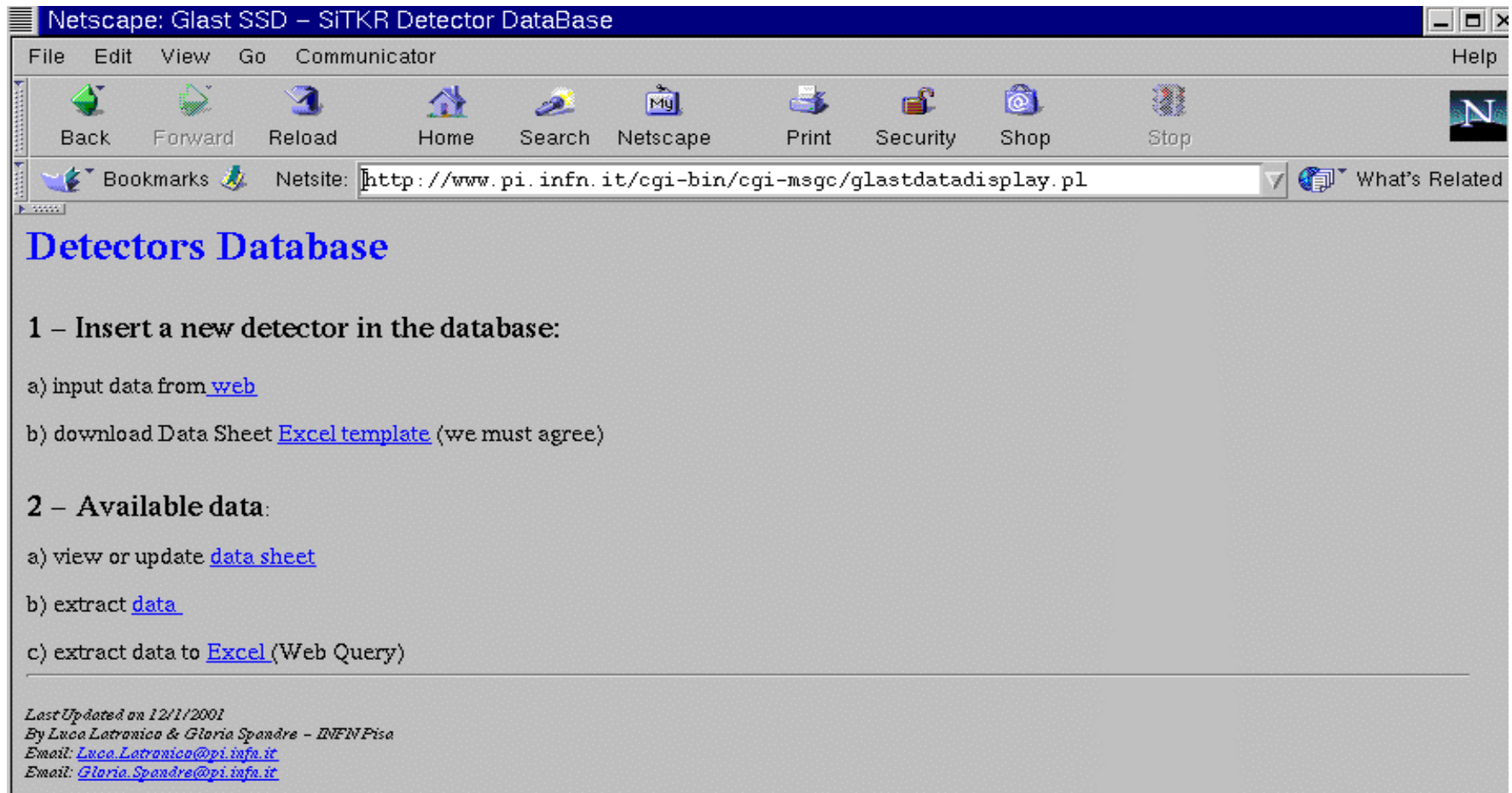
bad chans list

Bad SSD Chans list	
Comments	

Custom solution : SSD database prototype

Access from Pisa GLAST home page
<http://www.pi.infn.it/glast>
developed by me and Gloria Spandre
already used for small productions

I/O from web through
perl scripts on Pisa w³ server
data to ASCII files
I/O Excel compatible



Netscape: Glast SSD - SITKR Detector DataBase

File Edit View Go Communicator Help

Back Forward Reload Home Search Netscape Print Security Shop Stop

Bookmarks Netsite: <http://www.pi.infn.it/cgi-bin/cgi-msgc/glastdatadisplay.pl> What's Related

Detectors Database

1 - Insert a new detector in the database:

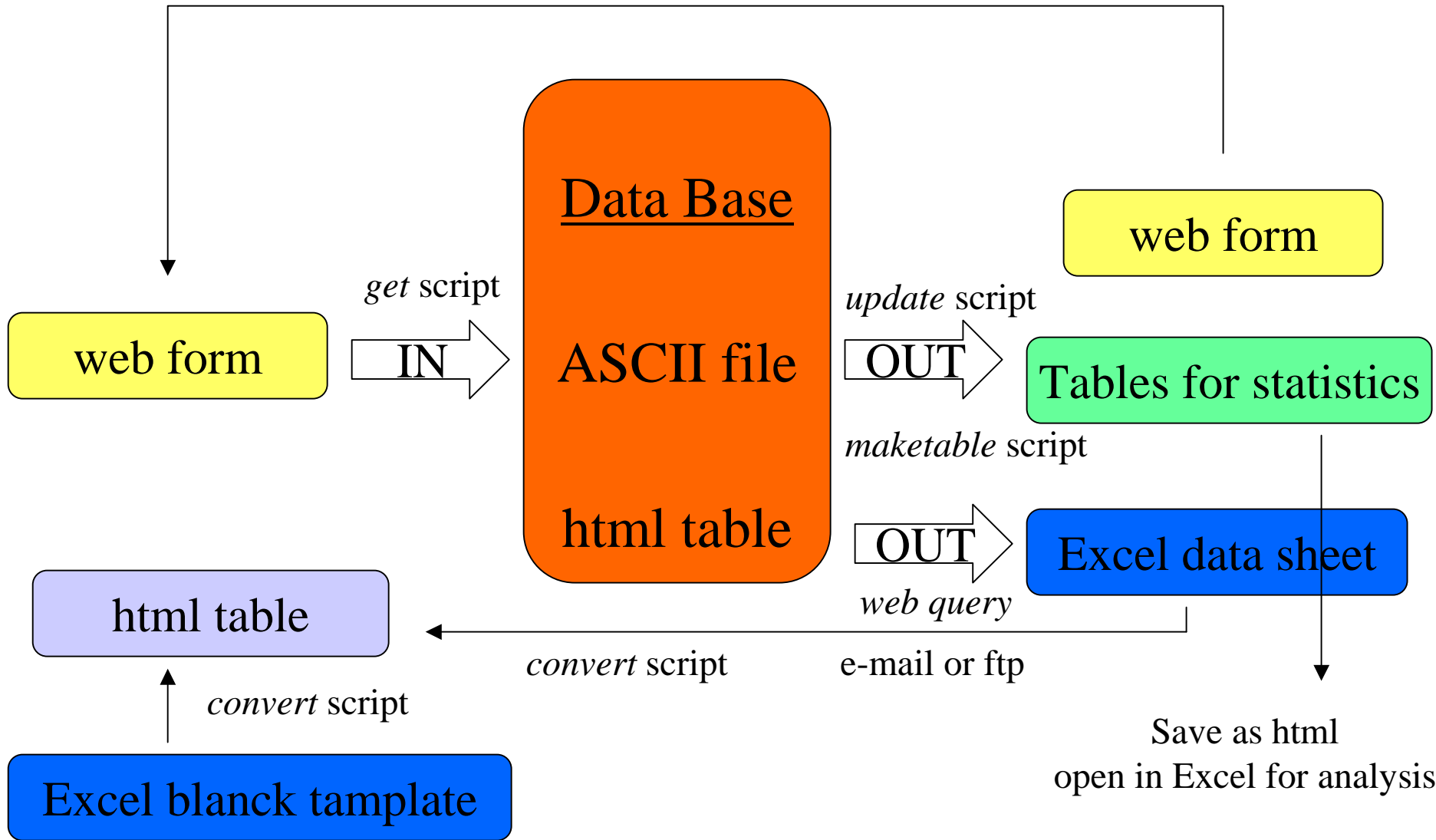
- a) input data from [web](#)
- b) download Data Sheet [Excel template](#) (we must agree)

2 - Available data:

- a) view or update [data sheet](#)
- b) extract [data](#)
- c) extract data to [Excel](#) (Web Query)

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SSD database prototype block diagram



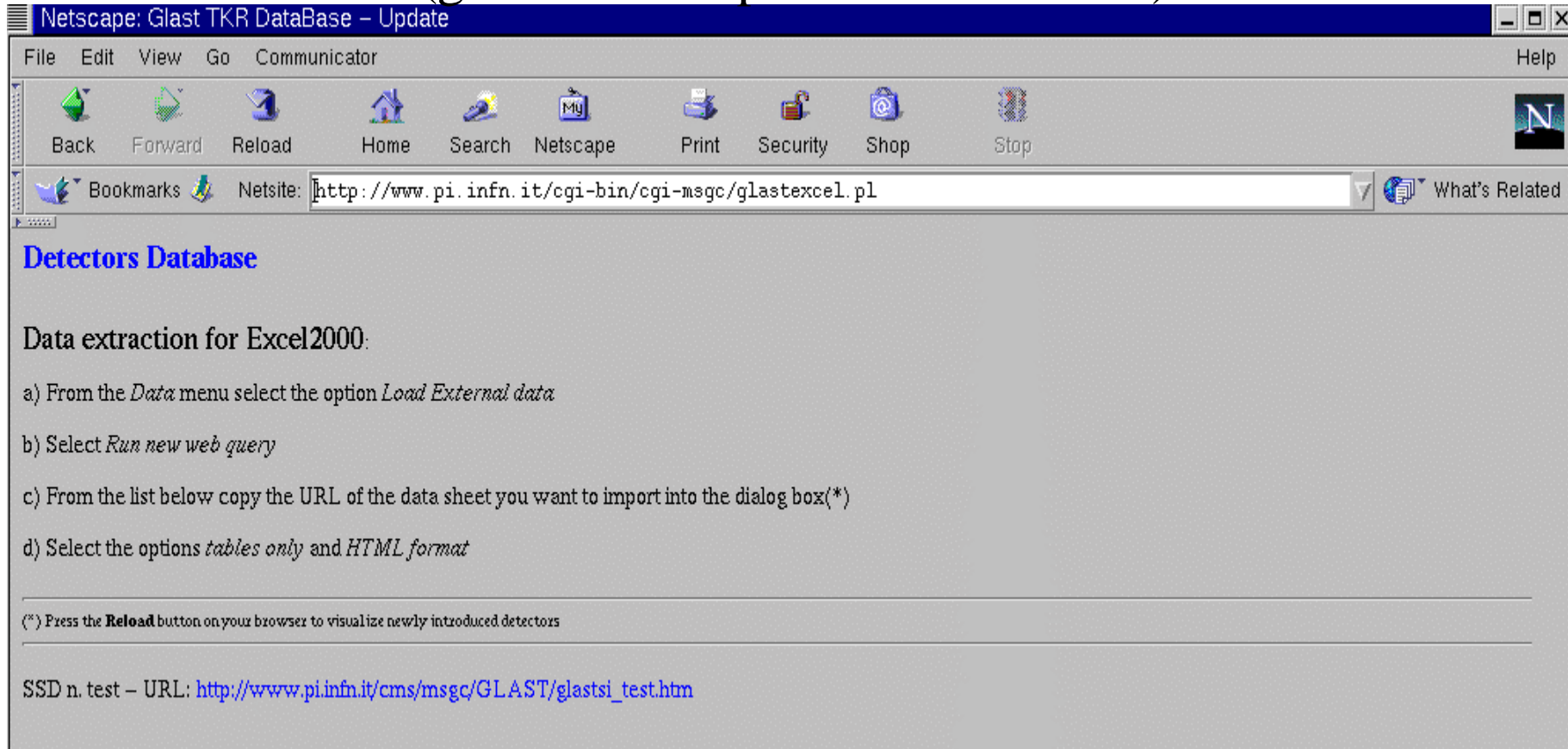
SSD database prototype INPUT : view/update

The screenshot shows a Netscape browser window titled "Netscape: Glast TKR DataBase - Update". The address bar contains the URL "http://www.pi.infn.it/cgi-bin/cgi-msgc/glastupdate.pl". The main content area displays the "Detectors Database" page with the following elements:

- Available data (*):** A section header.
- Select the SSD Data Sheet you want to update:** A text prompt.
- 12345** **test** : A list of data sheets with checkboxes.
- View/Update**: A button with a blue border and text.
- extract data to [Excel](#) (Web Query)**: A link to export data.
- (*) Press the **Reload** button on your browser to visualize newly introduced detectors**: A note at the bottom.

SSD database prototype : Excel INPUT

Download data sheet to Excel for update (*web query*)
(get blank template for fresh data)



Ftp server or e-mail to pisa - we run a script for conversion
how directly update Excel data to a server ?
really need a script to decode Excel into ASCII/html ?

SSD database prototype : OUTPUT for statistics

Netscape: Glast SSD - SITKR Detector DataBase

File Edit View Go Communicator

Back Forward Reload Home Search Netscape Print Security Shop Stop

Bookmarks Netsite: <http://www.pi.infn.it/cgi-bin/cgi-msgc/glastextract.pl>

Detectors Database

Available data (*):

Display the desired information following steps a) and b):

a) Select detectors:

12345 test

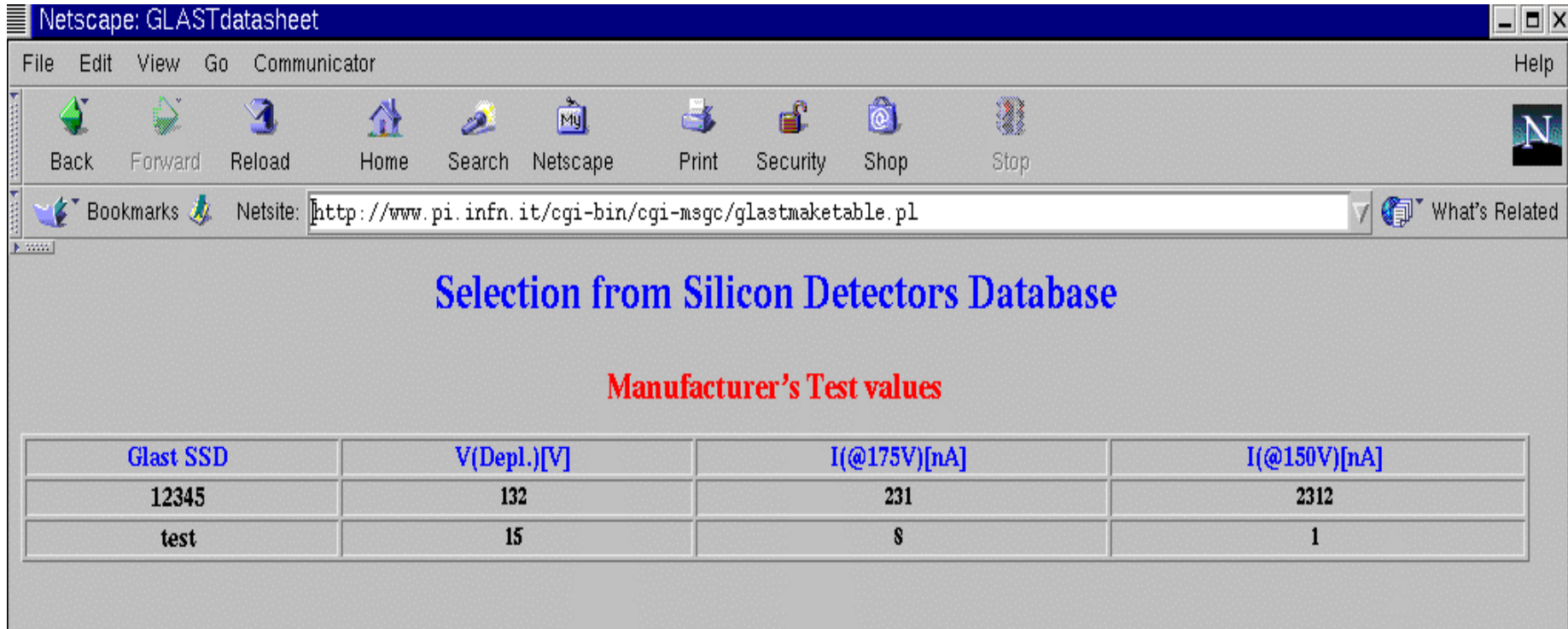
b) Select parameters:

Detector ID "#"	<input type="checkbox"/>	Manufacturer's test values	GLAST Value (Pre-Rad)			GLAST Value (Post-Rad) 100cy		
			Detector	Skinny	Baby	Detector	Skinny	Baby
Tester	<input type="checkbox"/>							
Date	<input type="checkbox"/>							
I (150v)	[nA] <input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I (175v)	[nA] <input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
V(dep)	[V] <input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
C(dep,1kHz)	[pF] <input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
#of Bad channels	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
R(Ave)	[MOhm] <input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
R(High)	[MOhm] <input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
R(Low)	[MOhm] <input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
R(Al Strip)	[ohm] <input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
R(Int-2neighb.)	[GOhm] <input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Bonding Pads location	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Agree with Table 5.1 in Specs?
Fiducial Marks location	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Agree with Table 5.1 in Specs?
Test Structures	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Agree with Figure LAT-GD-00027

(*): Press the **Reload** button on your browser to visualize newly introduced detectors

SSD database prototype : OUTPUT for statistics



The screenshot shows a Netscape browser window titled "Netscape: GLASTdatasheet". The address bar contains the URL "http://www.pi.infn.it/cgi-bin/cgi-msgc/glastmaketable.pl". The main content area displays the following text and table:

Selection from Silicon Detectors Database

Manufacturer's Test values

Glast SSD	V(Depl.)[V]	I(@175V)[nA]	I(@150V)[nA]
12345	132	231	2312
test	15	8	1

Save as html file to your pc and open it from Excel for further analysis

Custom solution : open questions

Agree on fields to use DB for quality tests of Hamamatsu sensors

Security : add passwords / **access logfiles**

Backup : now only two copies are stored -> add **data sheets history**

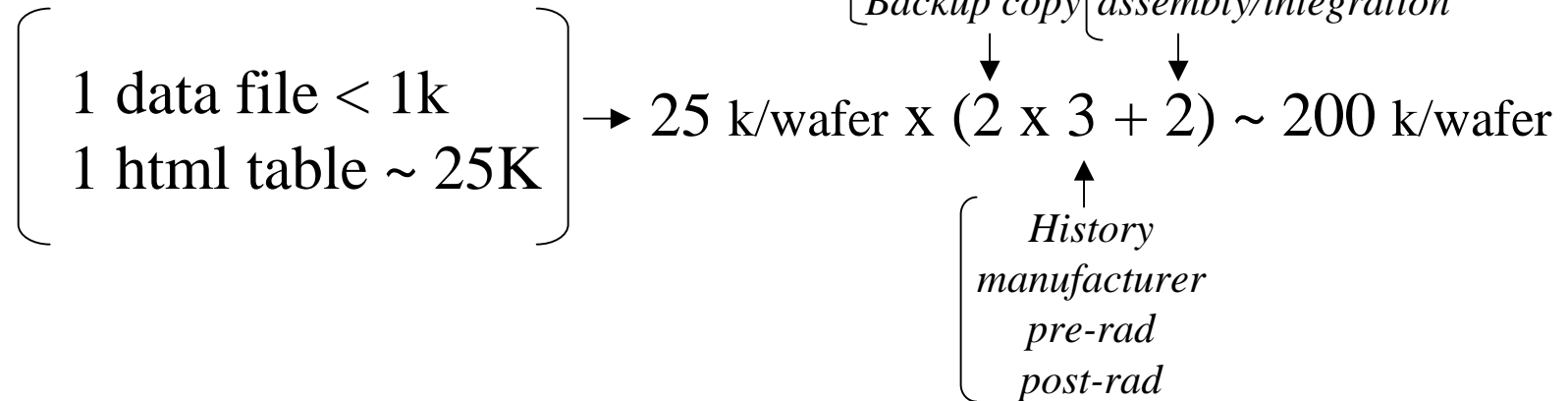
Move to higher levels (ladders/trays/towers)

Add-ons:

data cross-checks

macros / graphics for statistical analysis

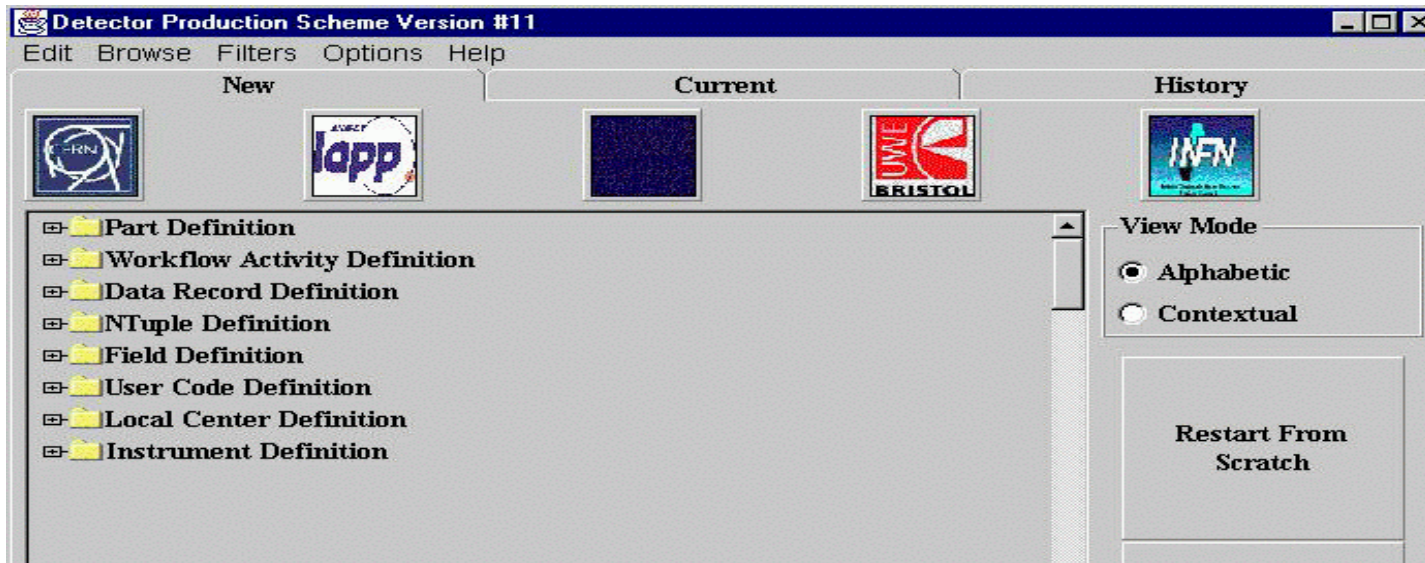
Data format : ASCII



200 k/wafer x 10k wafer ~ 2GB ok with a dedicated server (PC)
could remove html tables (create/delete selected for Excel web queries)
maybe needed for higher levels

Available products

- Commercial DBs ?
- DBs for LHC experiment: CRISTAL
 - developed for CMS ECAL
- distributed system: central repository and local administrators / stations
 - uses Objectivity (possibly use CERN / SLAC license ?)
 - built-in interface to Labview
 - customizable Java macros for data analysis
- optimized for workflow control that can be customized :



- now in use for ECAL construction
- locally in Pisa for Si TKR construction - happy if we also use it
 - we will ask developers a copy to evaluate it