CFT Trigger L1 and L2 Data Mapped into 60° Sectors

Nothing is impossible

How to solve the problem of mapping eighty 4.5º wedges into six Sectors

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REVISITING AN OLD FRIEND

That he symmetries of the Si Tracker (Hexagonal), the Central Scintillation Fibers Layers (Pentagonal) and the CFT Electronics (Quadrants) are not compatible was known long ago.

I made recommendations as early as 1995 to design the CFT electronics using sixty (3x4x5) or one hundred twenty (2x3x4x5) identical PC Boards. If that organization was accepted, I argued that no incompatibility will exist among the three geometries.

Overlapping regions between adjacent Quadrants (CFT) or Sextants (Si T), required that data from the eight (CFT) or twelve (Si) PC Boards located at the boundaries of the Quadrants or Sextants be sent to both adjacent Quadrants or Sextants.

Because …

… the number of PC Boards handling the Scintillation Fibers in formation is 80 (not a multiple of 6), today we have a ...

Problem:

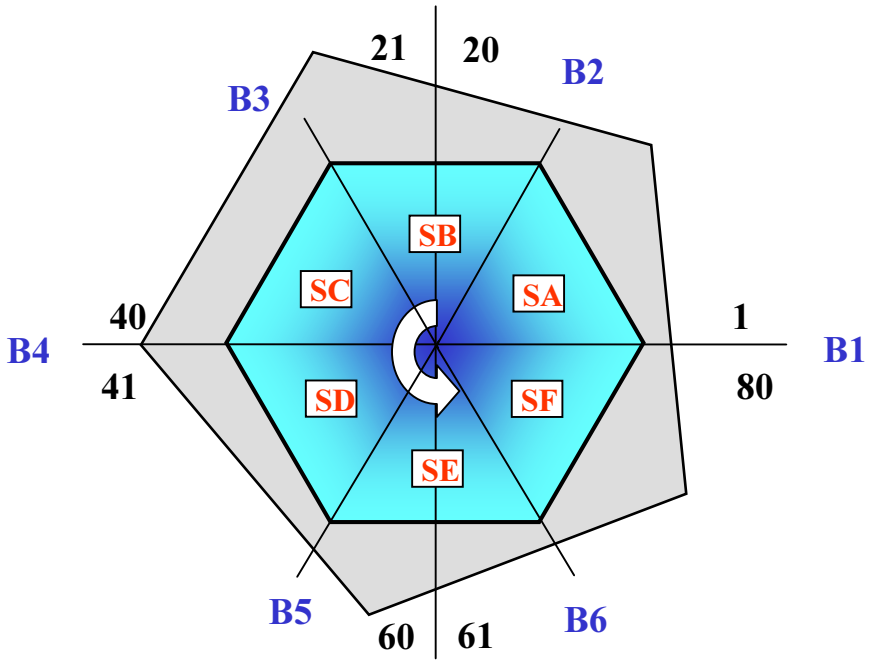
The organization of the Si Tracker into Sextants and the CFT into Octants are not compatible.

Solution:

Reorganize the data from the 4.5º wedges so that some information can be send to two adjacent Sextants.

This solution is obvious because some Si tracks found in a given Sextant are projected into an adjacent geometrical "sextant" of the CFT. This already require for some CFT wedges to share two Si Sextants.

The natural Pentagon created by the ribbons of Scintillation Fibers mapped into the Si Hexagon.



Sector's definitions

Sector SA	{ 0^0 , 60^0}	{B1 , B2}	{ 1 , 14* }
Sector SB	{ 60^0 , 120^0}	{B2 , B3}	{ 14** , 27** }
Sector SC	{120^0 , 180^0}	{B3 , B4}	{ 27* , 40 }
Sector SD	{180^0 , 240^0}	{B4 , B5}	{ 41 , 54* }
Sector SE	{240^0 , 300^0}	{B5 , B6}	{ 54** , 67** }
Sector SF	{300^0 , 360^0}	{B6 , B1}	{ 67* , 80 }

Only boundaries B2 and B5 between sectors are well defined

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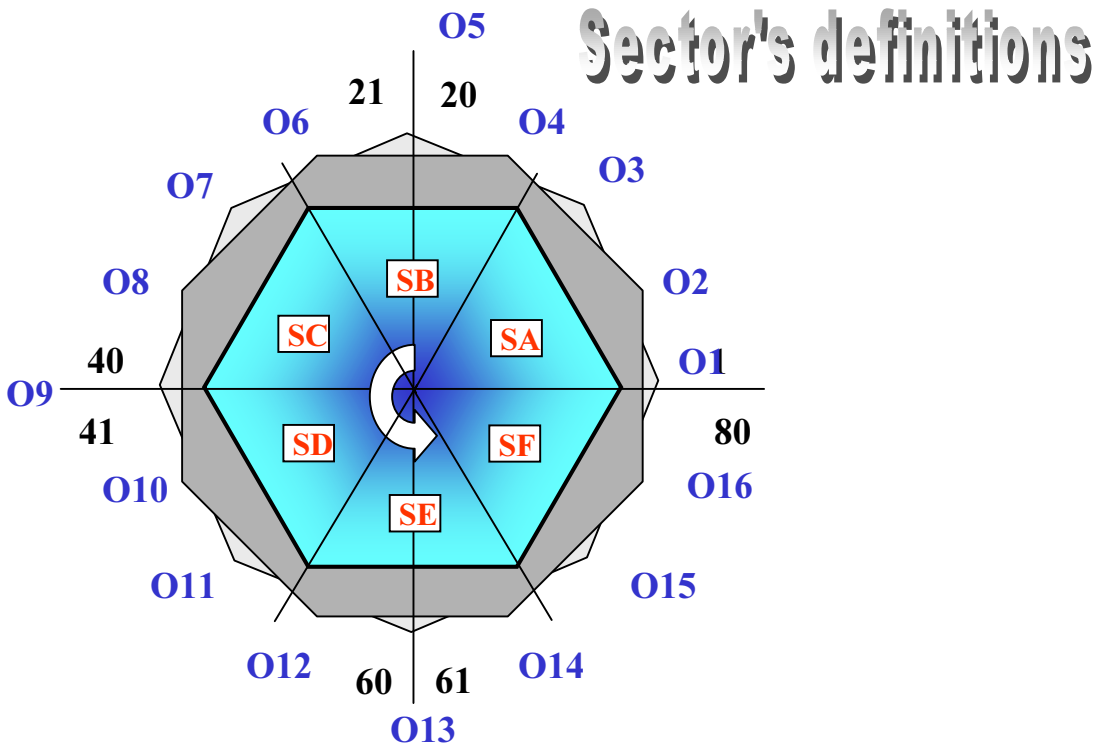
The natural Pentagon created by the ribbons of Scintillation Fibers mapped into the Si Hexagon.

Sector's definitions

mapped into 27° and 31° 30' Sectors.

Sector S1 { $346^0 30'$, $13^0 30'$}
{B79 , B3}
Sector S2 {$13^0 30'$, 55^0 }
{B4 , B11}
Sector SC {55^0 , 82^0}
{B3 , B4} { 27* , 40 }
Sector SD {82^0 ^{0} , $113^0 30'$}
{B4 , B5}
Sector SE {$113^0 30'$, 300^0}
{B5 , B6} { 54 , 67** }**
Sector SF {300^0 , 360^0}
{B6 , B1} { 67* , 80 }

The no so natural Octagon created by 80 PC Boards handling the Scintillation Fibers mapped into the Si Hexagon.



Sector SA	{ 0^0 , 60^0}	{O16 , O4}
Sector SB	{ 60^0 , 120^0}	{O3 , O7}
Sector SC	{120^0 , 180^0}	{O6 , O10}
Sector SD	{180^0 , 240^0}	{O8 , O12}
Sector SE	{240^0 , 300^0}	{O11 , O15}
Sector SF	{300^0 , 360^0}	{O14 , O2}