Document	**LIGO-M1200276-v1**
Date:	August 3, 2012
Title:	RODA: Increase of Schnupp Asymmetry from 5 cm to 8 cm
To the Attention of:	Calum Torrie, Mike Smith, Ed Chavez, Eddy Sanchez, aligo_sys
cc:	
From/ signatories:	Name/Title: Peter Fritschel, Systems Scientist / ISC lead Name/Title: Dennis Coyne, Systems Engineer *See the LIGO Document Control Center (DCC) for electronic approvals*
System(s) affected:	☐ Advanced LIGO ☐ Other:
Nature/ Scope:	☐ Design Decision ☐ Work Scope Decision ☐ Working Agreement between Groups ☐ Other
Subsystem(s) affected	☐ Relevant Subsystem(s)/Component(s): SYS, ISC, INS
Primary Contacts	Group or Affiliation and Contact
Reference Documents:	

DECISION/AGREEMENT STATEMENT:

The Schnupp Asymmetry is being increased from 5.0 cm to 8.0 cm, to improve the global length sensing with the signal recycling mirror transmission of 35%. A side effect of how this is implemented is that the arm lengths are each shortened by 15 mm.

Background:

Based on studies of interferometer sensitivity versus input power, the initial transmission of the signal recycling mirror (SRM) was increased from 20% to 35% in spring 2012; see LIGO-M1200134. Also studied was the effect of this change on the global sensing signals for the vertex lengths. This is detailed in LIGO-T1200128. The conclusion was that with the higher transmission SRM, the Schnupp asymmetry should also be made larger.

Decision:

The Schnupp asymmetry is increased from 5.0 cm to 8.0 cm, which is accomplished by:

- Moving ITMX 15 mm in the direction away from global zero (further from the beamsplitter)
- Moving ITMY 15 mm in the direction toward from global zero (closer to the beamsplitter)
- Leaving ETMX as is
- Moving ETMY 30 mm in the direction toward global zero (closer to the beamsplitter)

Note that as a result the arm cavity length is shortened by 15 mm, with a new length of: 3994.485 m. This change is small enough (4e-6 fractional change) that RF modulation frequencies are not affected.

See also E1200345 for a discussion of the impact of these moves on the BSC chamber layouts.