This is an ambitious Survey

1st large telescope stellar survey
1st use of multiple reductions
1st to target all populations

We have:
wide range of expertise
a lot of interest
strong ESO support
The Gaia-ESO Spectroscopic Survey

Our approach is to retain strengths of all proven methods, delivering both a recommended result and a range. Our challenge is to keep everything working together.
Gaia-ESO survey overview (1)

- VLT-FLAMES public survey of all stellar populations of the MW: Halo; Bulge; Thick & Thin disks; open clusters and associations. Beyond [Fe/H] to elements.

- Proposal March 2011. Recommendation from ESO/OPC: 300 nights (30n/semester) over 5 (4+1) years; start 1/2012 (P88), end 9/2016 (P97)+; visitor mode;

- will yield: >$10^5$ Giraffe spectra (R~20,000); >$10^4$ UVES spectra (R~47,000)
Survey design and strategy.

Field stars

Bulge survey targets – technically easy to do.

CHALLENGE: how to handle/model/select for the extreme biases due to red clump evolution?

Field target strategy:

Fix a box in the CMD with thick disk & halo turnoff

Figures show sdss vs VHS

Select thick disk/halo locus (left), implement in VHS (right).

VHS bulge data, b=40deg

BULGE??? RGB
Solar Neighbourhood: want a complete unbiased 5000-star sample. To be UVES parallel targets – definitive determination of local DF. Look at Mv~5.5, © unbiased survey to 1 kpc at V=15. Plus subgiants...

At V=15, survey 2000 thin disk, 2000 thick disk, 500+ halo, unbiased, complete.

Cannot select by Mv

Can select by colour

Mv=5.5
Survey Status

AEGIS & SkyMapper

• SkyMapper is the southern imaging survey with filters optimised for stellar astrophysics
• SkyMapper will (soon) provide targets for Gaia-ESO – halo turnoff & RGB, HBs, EMP candidates. Will allow us to better define the wings of the metallicity DF
• AEGIS is the AAT spectroscopic survey based on SkyMapper – 400 fibres, SNR~15 at the Ca-K line for a G star (1.5hrs). 3700-5700Å; R~3000, & Ca-T R~11,000
• Plan 180 AAT fields, 60 done, 15000 spectra
• AEGIS is complementary to and coordinated with Gaia-ESO – we will also observe common calibrators
• Follow-up of S-M EMP stars collaborative, led by Stefan Keller, follow-up of halo turnoff stars is ours
Survey data products

- LOTS!!!
  - reduced, wavelength calibrated 1D spectra
  - the photometry (and additional membership information for the clusters) used to select the targets
  - open cluster relevant data (e.g. distance, age) and star identifications
  - object classification (for field stars)
  - radial velocity and error estimate
  - Projected rotational velocity and error estimate (where relevant)

  for stars observed with GIRAFFE:
  - stellar astrophysical parameters: effective temperature, surface gravity
  - equivalent widths of absorption and emission lines (when present)
  - typically, stellar metallicity [Fe/H]
  - whenever possible [alpha/Fe]
  - lithium abundances for solar-type and cool stars in clusters
  - robustly determined errors on all parameters
  - measurements of chromospheric activity or accretion, for cluster members (where relevant)
  - quantitative mass loss estimates, for early-type stars
  - The GIRAFFE spectra should allow measurement of Mg, Ca, Ti and Fe for the majority of the F-G-K stars.
  - For Bulge K giants also Si, Cr, Mn, Co and Ni, and possibly other elements, should be measurable.

  for stars observed with UVES:
  - stellar parameters derived from the spectra
  - robustly determined errors on all parameters
  - elemental abundance estimates for some or all of the following elements (where stellar abundance and astrophysical parameters permit):
    - C, O, Na, Mg, Si, Ca, Sc, Ti, Cr, Mn, Fe, Ni, Zn, Y, Zr, Ba, La, Ce, Eu
  - We will also include selected matched multi-wavelength data for each source.
Survey status

• 8 x 5N observing runs complete
• Weather mediocre ~25% loss
• Progress OK
• Processing OK
• RVs OK
• Abundances – tbc
• Big meeting: Dec 2012
Milky way fields targeted

red = prepared, green = observed @ May 2012
Low extinction, high latitude – need redder targets

UVES FG sample
Thick disk
Halo TO - SkyMapper
Halo giants?
BULGE TARGETS: red clump stars from VVV, plus EMP candidates from SkyMapper
γ Velorum (5-10 Myr)

Jeffries et al. 2009 data
HP members: 932
LP members: 620
Tycho photometry: 24
Trumpler 20 – 1 Gyr